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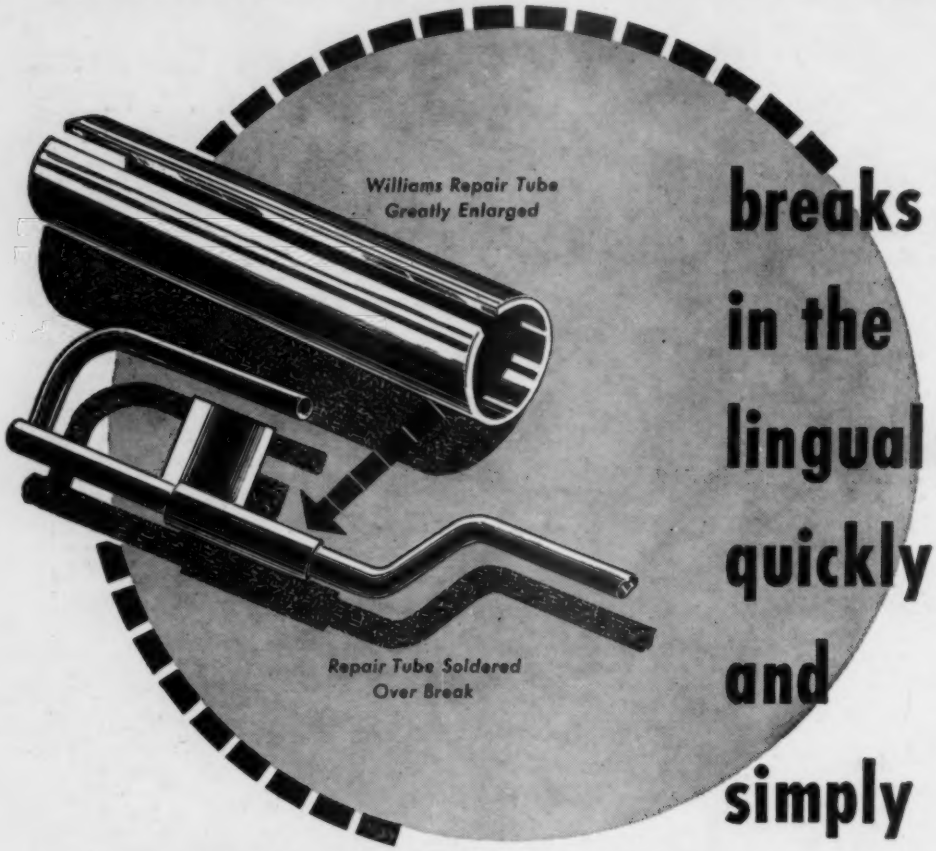

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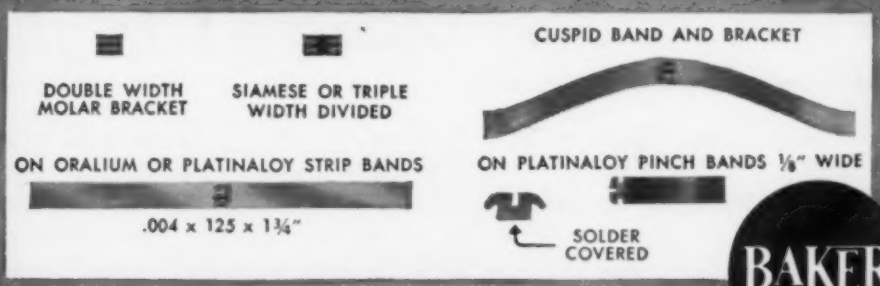
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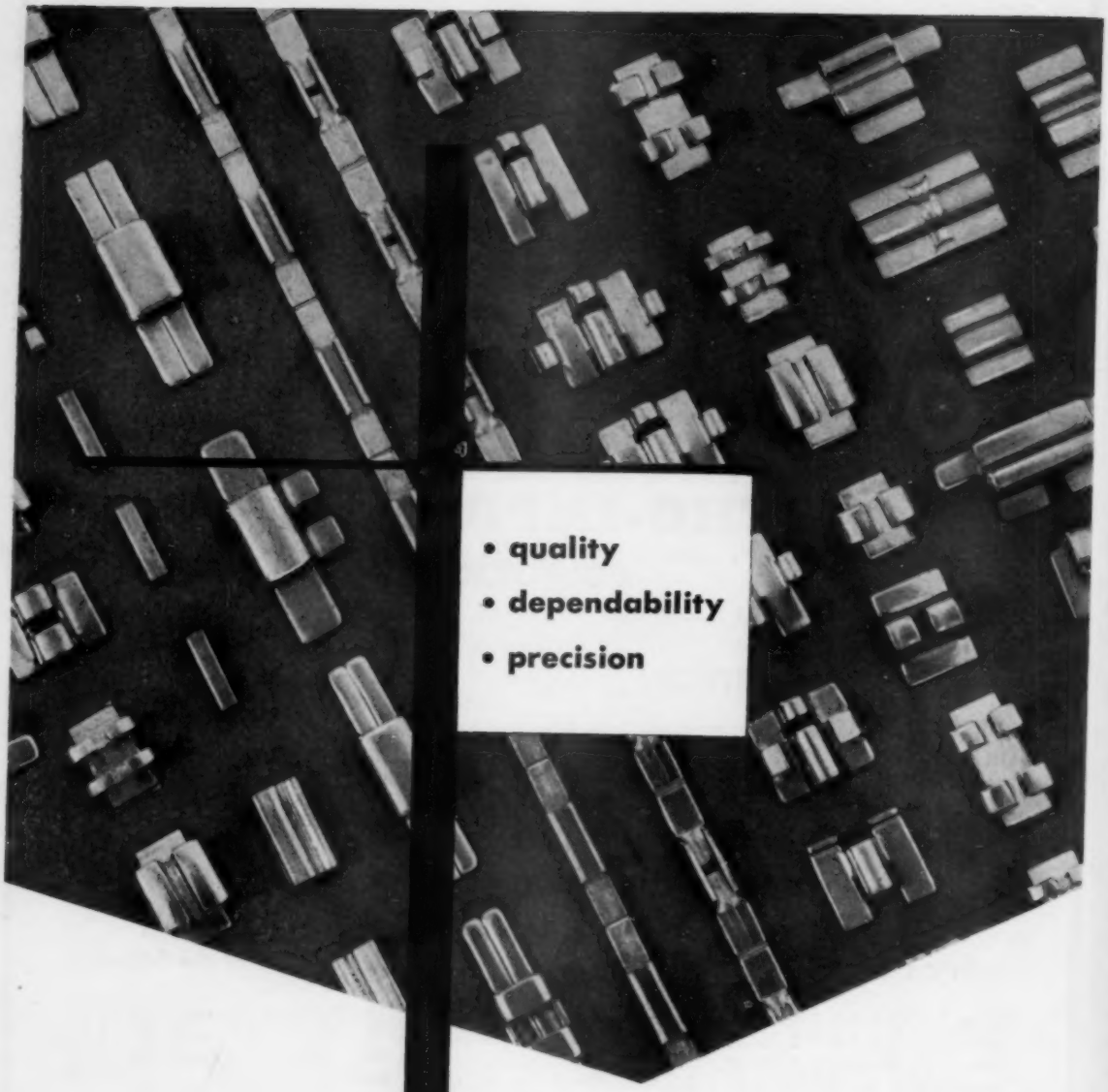

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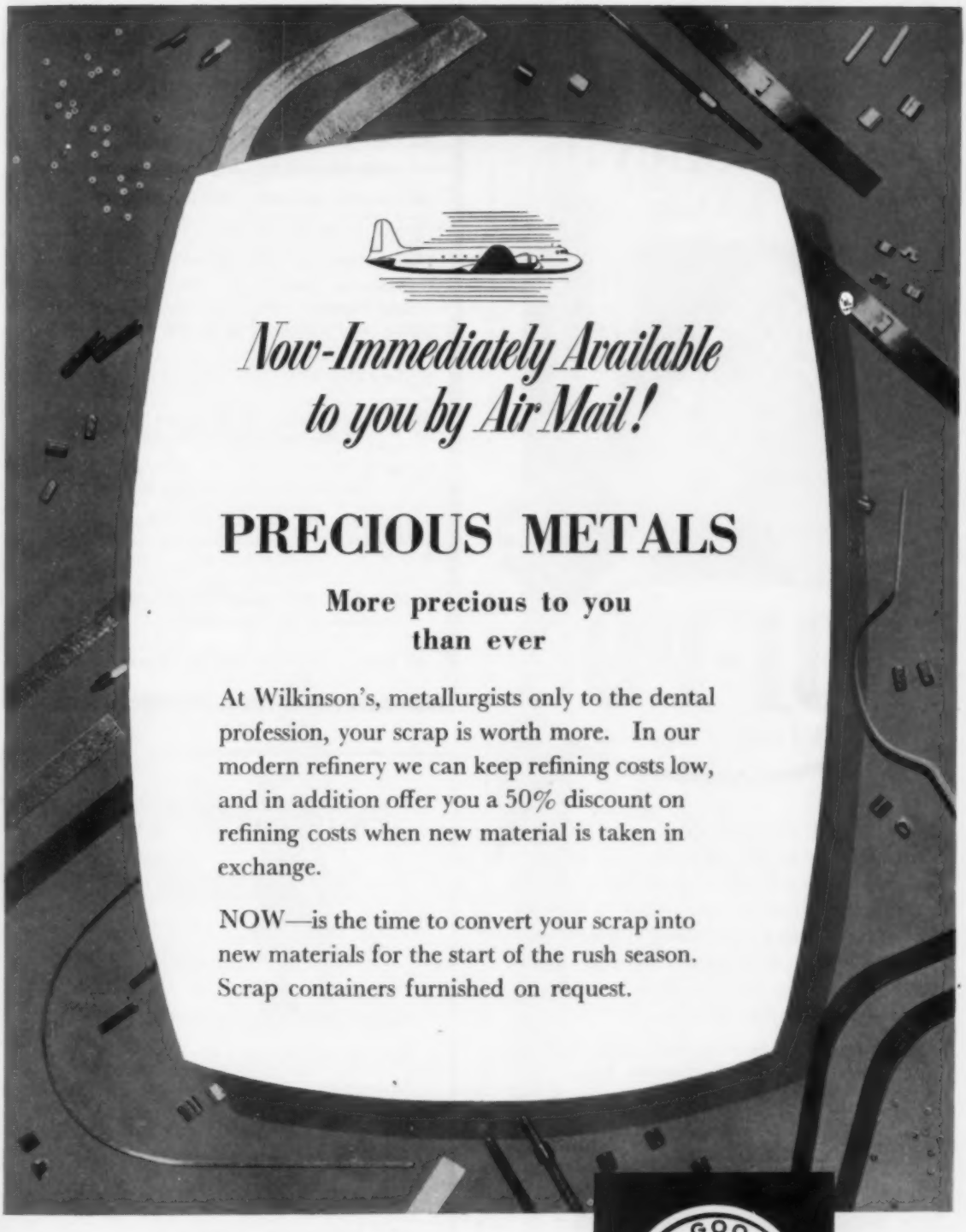

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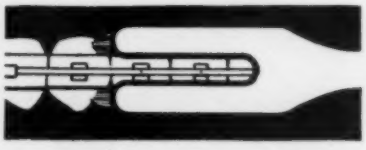

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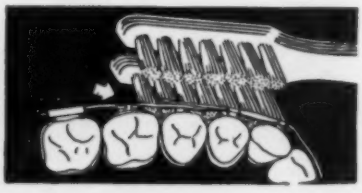

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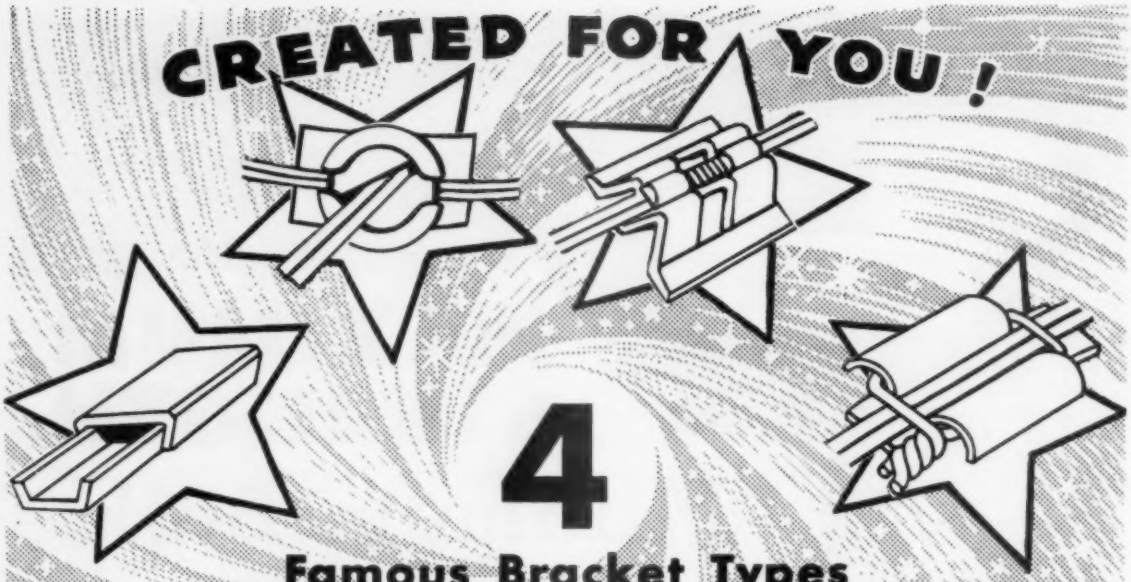

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TRU-CHROME FOR DELICACY AND STRENGTH

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Original Articles

FEDERATION DENTAIRE INTERNATIONALE

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IT WILL be my endeavor to tell you very briefly about the Federation Dentaire Internationale (F.D.I.), an international organization of which I now have the privilege, as well as the honor, to serve as president.

I wish to clear any misconceptions which may arise about this organization. I wish to describe briefly the functions, objectives, ideals, and the contributions which have been made and may be reasonably expected of the Federation.

The F.D.I., as it is usually called, is a permanent association or universal union of national dental societies. It has a central government, but allows each component association to retain most of its independence in local affairs.

The Federation has as its functions:

(1) The promotion of international dental congresses at regular intervals of five years.

(2) The maintenance and strengthening of the bonds of fellowship between national dental societies.

(3) The encouragement in a general way to any activity that the organization may advance that may contribute to dental science.

(4) The collection and collation of scientific data in the dental field.

(5) The awarding of the Miller Prize and other international awards.

(6) The publication of an international dental journal.

(7) The collection of professional documents with a hope of eventually establishing documentary centers throughout the world.

The objectives of the F.D.I. are, as you would expect, the attainment of the highest level of dental health for all people in its relation to the individual. It has been said that all great international organizations conform to certain fundamental characteristics. Enumerated they are:

(1) The original concept of the organization is the product of one mind and not the result of a committee deliberation.

Address given before the International Luncheon of the American Association of Orthodontists, Dallas, Texas, April 28, 1953.

*President, Federation Dentaire Internationale.

(2) The time and moment are favorable for the germination of the seed which the originator is endeavoring to plant in the minds of his fellows.

(3) The scheme must be realistic and not simply visionary.

(4) The organization must be able to discharge adaptive functions.

(5) The ideal of the organization must be directed toward a goal which has a universal appeal to the minds of all men of good will, irrespective of their race, politics, or religion.

An outstanding example of this universal appeal is found in the Red Cross of Geneva, and the International Rotary which I feel possesses characteristics similar to those we claim for the F.D.I. As you would expect, the F.D.I. is indissolvably bound up with the history of the dental profession. I could easily describe it to you as a serial story with each chapter ending with an international dental congress. If this procedure were followed we could reach the end of Chapter XI in London last July. This congress exhibited the pattern of a true and realistic peace congress and was considered the finest we have held to date.

The first three congresses were held in Paris in 1889, in Chicago in 1893, and again in Paris in 1900 at the time of great International Exhibitions. These congresses were most successful, especially the third. The dependent position of dentistry, however, did not satisfy the members of the committees appointed to organize these congresses.

Charles Godon, president of the third congress, was a natural leader. He fully appreciated the powerful instrument of progress that international congresses could have on the special science and art of dentistry. This type of thinking caused the creation of the F.D.I. which has served as a permanent international body functioning as a promoter and regulator of international congresses. The idea proposed by Godon was received with enthusiasm by the 1,200 dentists representing the principal dental societies of several countries of the world. On Aug. 4, 1900, in Paris, the F.D.I. was born. The organization was created by virtue of the following resolution:

(1) There shall be constituted an international dental federation.

(2) The national committees appointed by this congress shall remain in office and shall constitute the F.D.I.

It was found among the members of the newly appointed council, whose duties were to meet annually, that it was apparent there was more to do than to proceed with arrangements for the next congress. There was a problem of education and a need to help the poor to obtain relief. Therefore, the first two committees appointed were the Committee on Education and the Committee on Public Dental Hygiene, later becoming the Committee of Public Dental Service. This is a significant fact and, no doubt, explains the astonishing vitality of the F.D.I. Education and the care for the dental health of the poor have run through the whole activities of the F.D.I. Every meeting, as well as every Presidential Address, has been imbued with the same practical idealism.

After the preliminary discussion with representatives of the Interim Commission of the World Health Organization, I am sure you will be interested

in the following: outside of the Red Cross of Geneva, the only international health organization to stand firm and unshaken during two world wars was the F.D.I. It seems that the F.D.I. in its own sphere has attained the goal that the United Nations is so earnestly striving for and which the League of Nations failed to reach.

Godon and his colleagues built the organization on a sound psychological foundation. It has promoted a harmonious activity which has led to international and peaceful cooperation. These two instinctive impulses are the creative desire and the impulse toward self-sacrifice.

At this point I know that you will be interested in a brief explanation of the origin of modern dentistry. In the Eighteenth Century, France was supreme in the art of dentistry. Pierre Fauchard and his book on dentistry published in 1728 is universally admitted as representing to modern dentistry what the Hippocratic Canon of 400 B.C. is to modern medicine. About the time of the War of Independence, French surgeons introduced the dentistry of Fauchard in America with the result that in 1840 Hayden and Harris founded the Baltimore College of Dental Surgery. They obtained recognition of a university degree, D.D.S., and established a precedent of giving the right of the title of doctor to the dental surgeon. At the same time, by progressively raising the standard of the curriculum and examinations, America became supreme in the art of dentistry, thereby saving the profession from domination by medicine and the problem of the unqualified practitioner.

In France the fate of dentistry was different. One of the acts of the fanatics of the French Revolution was to remove all control from the practice of the professions. In 1795 the medical schools were reopened and in 1802 the regulations concerning the practice of medicine and surgery were reimposed. It was claimed that dentistry was a specialty of medicine and could be practiced safely only by a stomatologist possessing a full medical diploma. Thus, for 100 years (1792 to 1892), the dental profession in France possessed no charter. The tension between the odontologists and stomatologists was particularly acute in France and Belgium and to a lesser degree in Holland. The Scandinavian countries, Switzerland, and Germany did not have great difficulties, but Italy, Austria, Hungary, and some of the others favored a full course of medical studies.

British dentistry occupied a unique position since its origination by John Hunter, the celebrated pathologist and surgeon. The Royal College of Surgeons, with no medical or surgical diploma required, issue license to practice in Britain. There was no quarrel between the odontologists and stomatologists, as both belonged to the British Dental Association. Also, during this period many distinguished American graduates practiced in capital cities of Europe.

Strictly speaking, each official meeting of the F.D.I., which includes a convening of a general assembly, may be termed a congress. We must distinguish between annual sessions of the permanent organizing body and the larger meetings held every five years, the latter being designated as The International Dental Congress.

The span of 1901 to 1914 can be called the first functional period of the F.D.I. During this time, thirteen of the fourteen sessions were held in Europe. The contribution by the members from the United States has been directed by a desire to help the Federation to become truly international. That has been the reason why there has been no insistence on rights and privileges, gauged by the number of members, in the national dental societies.

It is only necessary to read the reports of the discussions at the annual meetings and at the congresses to become impressed with the high standard of educational and intellectual attainments of the group. Their single-minded desire to make dentistry a great profession can be sensed as one reads the reports.

When preparations were made for the 1914 congress new committees were appointed as follows:

(1) Military and Dental Service
(2) History of Dentistry
(3) International Dental Press
(4) Terminology
(5) Jurisprudence and Dental Ethics

In 1921 a truly generous decision was made by the representatives of the invaded countries of Europe. They agreed to abandon the outward manifestation of war hate and to work for the spirit of peace among all nations. The second functional period may be described as the period from 1921 to 1939. The F.D.I. was the first international organization to resume its regular routine after World War I, and there followed an unbroken series of annual meetings for the next eighteen years. This second period was possibly even more dependent upon a few outstanding personalities than before the war. The F.D.I. was fortunate to have as its president, a strong personality, Dr. Truman Brophy, Dean of the Chicago College of Dentistry. The third functional period followed after World War II. At a regular meeting of the F.D.I. in Paris toward the end of 1946, Dr. Rowlett of England was elected president. He had been serving in this capacity since the death of Dr. Logan. It was decided to take steps to hold a congress in Boston and to accept the unofficial invitation to organize the 1952 congress in London, should the British Dental Association make the invitation official.

The period of 1948 to 1952 has been the most amazing one in the history of the F.D.I. From my point of view it is the gradual emergence of a postwar F.D.I. to a true federation of national dental associations. It is a triumphant example of the advantages of a liberal form of government under which we are fortunate to live. It stimulates the creative minorities with the individual at liberty to work without hinderance in a nongovernmental international organization, its objective being the well-being of mankind.

The most recent international meeting was the Eleventh International Dental Congress. This was held in London, England, in 1952. It was one of the best dental meetings it has been my privilege to attend. More than seventy-five governments or governmental units were represented at the congress. It was held in the Royal Festival Hall, a magnificent structure built for the 1951

Festival of Britain. The congress was splendidly organized and such handicaps as a multiplicity of languages were readily surmounted. The scientific program covered topics of wide interest. The social program was attended with all of the magnificence which is traditional to such events in Great Britain. That meeting was attended by more than 800 dentists from the United States.

Now with the readmittance of the German and Japanese Dental Associations and the decision of the House of Representatives of the American Dental Association, to officially recognize the Federation by joining as an affiliated member, the future of this great Federation appears to be assured. The statutes and rules of the F.D.I. now have been completely revised in line with modern thought and precept with its affiliation as a nongovernmental organization to the World Health Organization. We might correctly refer to the year 1953 and onward as the fourth functional period of the F.D.I.

I feel that the F.D.I. is a perfect pattern for a true peace congress for men of good will. The objective of the last congress held in London was focused upon dental health. A practical ideal was set up and a practical goal provided for which every nation of the world, irrespective of race, religion, or politics, could unite in striving to attain.

The profession of dentistry is young, dating only as far back as the Eighteenth Century. There is much ignorance, superstition, apathy, and fear inculcated into the minds of the people of the world. There is much to be done in every single country, each with its specific problems and difficulties. It is axiomatic, therefore, that the mutual sharing of each other's problems is of benefit to all. It is equally true that international good will and brotherhood is the significant thought and fervent hope of the majority of the peoples of the world.

The F.D.I. in its particular sphere of international activity can help to forge the link which binds nations together. The Federation must play an important role in the furtherance of oral health and dental fitness throughout the world. These aspirations alone are sufficient justification for the continance of a federation which is dedicated to the good of mankind.

1915 Broadway.

AMERICAN DENTAL ASSOCIATION

OTTO W. BRANDHORST, D.D.S.,* ST. LOUIS, MO.

IN RESPONDING to the gracious remarks of your toastmaster, may I say that I bring to you, the orthodontists of America and other countries, the greetings and best wishes of the American Dental Association, of which most of you are members. The American Dental Association holds this group in high esteem and recognizes the many contributions that have been made by many members of the orthodontic specialty group toward the well-being and comfort of those whom it has been your privilege to serve.

It was only a little more than a decade ago that the dental profession observed its centennial. We have come a long way since the 1840 days of the first dental school, the first dental journal, and the first dental organization. What of today? Certainly, no one will say that there is any shortage of dental organization, or a lack of dental meetings to attend. Each of us probably would like to have a few hours more each day to peruse the dental literature that is so readily available to us. Until recently, those persons who wished to study dentistry usually found a place in one of the dental schools to satisfy their desire. The increase in the number of persons desiring to enter the profession of dentistry today, in itself most gratifying, has been stimulated, basically, by two factors: (a) the emergence of the profession from a mechanical to a biologic technologic basis which has established it as a recognized important division of health service; and (b) a greater appreciation of this service by an ever-increasing number of the people now being served.

As we look back upon this development, we realize that we have passed through stages of development that even now seem most logical. The objectives of these stages, as Fleming[1] has pointed out, might be outlined as follows:

"*The first objective* was the relief of pain. This would be accomplished with no preparatory requirements, except possibly a strong right arm.

"*The second objective* was that of restoration of teeth and parts of teeth. Educational requirements were satisfied by the apprenticeship method of education similar to those used today in the arts and crafts.

"*The third objective* was the elimination of infection, and was influenced by the discovery of the relationship of the diseases of the teeth and oral cavity to the body. One might designate this as the focal infection period. With this new objective, the apprenticeship method of education no longer sufficed; education on the college level and in the health sciences was instituted.

"*The fourth objective,* the control of dental diseases, represents the present era in the practice of dentistry. This began in the late 'teens' and early 'twenties,' and is associated with the slogans, 'A clean tooth does not decay,' and

Read before the International Luncheon of the American Association of Orthodontists, Dallas, Texas, April 29, 1953.

*President, American Dental Association.

'see your dentist twice a year.' Many of us, active in the profession today, received our education and have practiced in this period. Educational requirements were increased to include a better understanding of the biological framework of the medical sciences, and a broader background of the humanities and social and economic problems. Health sciences occupied a more important place in this curriculum. Dental education was lengthened by increased preprofessional preparation. Clinical investigation became a part of dental education and some fundamental research began to appear.

"*The fifth objective* is located along the *road to the future* and can be labeled as the period of prevention. Educational requirements must include a greatly expanded program of biological and medical sciences, research and stimulation of the public health approach to our dental problems."

A bit later in the same address, Dr. Fleming summarizes all this:

"The history of dentistry, appears to have been a progress along a road with many crossroads. In 1840 a tempting road leading to the field of medicine appeared. Later, the Amalgam War and fight of the process patents could have forced us along the path of a trade. The ideas of Owre, and more lately the so-called sub-level dentistry plans, showed up as crosroads at frequent intervals. The road of medicine appeared so often as to be almost considered a lateral highway.

"These problems, acute as they were in the past, were relatively simple in that they concerned, for the most part, only the dental profession. Dentistry did not occupy a very large part of the scheme of national health, and problems that were of great concern to the profession were not apparent to the public.

"Today, the picture has changed in that we are an important part of the national health program. Social, economic, and political forces with which we have had little experience, are at work. Sociologists are planning the work ahead for the profession. Economists are planning our course of action. Legislators are determining our objectives and selecting the best method of approach. People in the field of general education, with little knowledge of the detailed problems of dental education, are pointing this way and that. This great variety of plans and programs is a piece-meal approach to our problems and tends only to complicate an already confused picture. It would be better for the dental profession to consider all of the economic, social, political, and educational aspects of our problems than to listen to this group and that group and advocate any one of their particular solutions."

If we analyze the developments of the field of orthodontics, we find a similar pattern. At first, we thought of straightening a tooth or teeth. Then we became involved with systems to accomplish this end. A broader interest in facial balance brought with it intensive studies in diagnosis of dentofacial deformities and causative factors associated with them. This was followed by desire for more knowledge in the biologic processes associated with growth and development, and appliances are simply mechanisms as a means toward an end, and a better understanding and appreciation of normal developmental processes leads logically to the application of control and preventive methods in the field of orthodontics as in the general field of dentistry.

There is no doubt that control and preventive methods in dentistry will have an early and favorable effect upon the problems associated with our own field of orthodontics and, as orthodontists, our interest in fluoridation should be as keen as any group in dentistry.

We find ourselves today in the beginning of a major development in the broadening biologic aspects of our services with control and prevention as our chief objectives. This does not mean the replacement of the technologic accomplishments, which have reached such a high degree of development, with the purely biologic aspects, but rather the use of the former to supplement the latter.

In this development, two areas become more and more important, namely, research and education. Through research it will be possible to unravel some of nature's processes and, through education, the application of the newer knowledge and the coordination of technologic procedures with these findings will be made possible.

That the trend today is in the direction of control and prevention, in all of the health services, seems quite evident. If orthodontics is to keep pace with these developments, it must become a major participant in this movement. As it does so, emphasis must shift to the prevention of dentofacial deformities. To be sure, there will always be need for the application of our technologic methods, but the trend will be toward simplification in appliance therapy. The guidance of facial development, which is basic in the control program, of necessity, sees the child under observation at an early age and this, if properly approached, will reduce to a minimum the need for long and tedious treatment. The removal of tooth units in the course of treatment, now often an expediency, because guidance and treatment have been delayed, will also become minimal, as early attention and guidance find their proper place in a control and preventive program.

Dentistry and orthodontics have developed rapidly from a craft into a profession and an important segment of the nation's health service.

The program of control and prevention gives clear evidence of the stature of the profession. Here, the profession is functioning at its best.

In these efforts we need and solicit the support of all the members of our profession, here and elsewhere. This international luncheon is evidence of the desire of the members of the profession to cooperate, extending their best efforts to the children of all countries. May these relations continue for the benefit of the children of the world, whose future facial development is in our hands.

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4952 MARYLAND.

THE PROBLEM OF RETENTION

ALEXANDER SVED, D.D.S., NEW YORK, N. Y.

PRESENTING a series of case reports to the First International Orthodontic Congress in August, 1926, Axel F. Lundstrom of Stockholm, Sweden, began his paper with the following statement:

> For some time past our orthodontic technic has been very efficient. With a few exceptions, which are too well known to require any special mention in this audience, it has been possible for the operator to perform any orthodontic operations that seemed indicated. But it seems to me now to be pretty generally conceded that in a rather considerable percentage of cases the immediate results are far from permanent.

Today, more than twenty-five years later, we are in a much better position to judge the efficiency of our technical procedures, and, although we have made great advances in our appliances, we would hesitate to say that it is possible for us to perform any orthodontic operations that may be indicated. On the other hand, we will readily admit that "in a rather considerable percentage of cases the immediate results are far from permanent." In fact, we all have a good percentage of relapses.

The collapse of a completed orthodontic case, even after a prolonged period of retention, was attributed to the inefficiency of the operator. It was not until it was realized that other factors may be responsible that we began to look for other explanations. Even today, the etiology of most malocclusions is little understood, and it was suggested that the inherited pattern of an individual cannot be changed permanently. Consequently, when the completed form deviated from the inherited pattern, relapse was thought inevitable. Furthermore, under the influence of Angle, it was firmly believed that if normal occlusion of the full complement of teeth was established by orthodontic means, the new relationships would be maintained permanently by normal function. We soon were to learn that this was not necessarily true, and many of our cases failed after the retaining appliances were removed. In the search for the correct explanation of these failures, it was discovered that when the full complement of teeth was brought into alignment, there seemed to be a discrepancy between the tooth material and the supporting bone. The corrected cases had a protrusive appearance. This led to the observation that the supporting bone cannot be changed by orthodontic means, and in order to maintain a harmonious profile it will be necessary to reduce the tooth material by the extraction of certain dental units.

Read before the Northeastern Society of Orthodontists, New York, N. Y., March 9, 1953.

According to Lundstrom, "the bandlike area extending along the dental arch and alveolar process parallel to the crowns of the teeth and the alveolar process may be called the dentofacial zone. This zone may be divided into an apical and a coronal zone, the former being described as 'the narrow band-like area extending along the gingivae, parallel to the apices of the teeth.' . . . The immediately adjoining section, upon which the region that is limited by the apical zones rests or to which it is attached, may be called the apical base."

"The alveolar process has been regarded as a region in certain respects independent of the jawbones and intimately connected with the presence of the teeth. From the description, however, of certain peculiarities in the pathological anatomy of the region in question, it would appear that the alveolar process and the position of the teeth are dependent upon the form of the apical base. When the latter is normal, and only then, is a normal position and a normal occlusion of the teeth possible."

These statements by Lundstrom gave us a new method of approach to the treatment of orthodontic cases, and it became clear at once that the so-called ideal occlusion of Angle was not attainable in every instance. The acknowledged skill of orthodontists in the manipulation of the appliances and the very efficient orthodontic technique left nothing to be desired so far as treatment was concerned, and the instability of the completed cases was attributed to the disharmony between the amount of alveolar bone required to support the teeth and the apical base. This interpretation of conditions permitted the formulation of a logical diagnostic scheme, but more particularly it gave us a basis of reasoning. It readily was admitted that the establishment of normal occlusion with the full complement of teeth was desirable, but it was not always attainable on account of the discrepancy in size between the required alveolar process and the apical base. Therefore, to assure stability, the alveolar process had to be harmonized with the apical base by the extraction of a number of teeth. In time this became mandatory because we were told that it is not possible to change the apical base by orthodontic means. This well-conceived approach to diagnosis takes into account the ability of "the operator to perform any orthodontic operations that seemed indicated," for it is explained by Lundstrom that even in 1926 the orthodontic technique was very efficient. His sincere and apparently scientific explanation was accepted, and today it forms the basis of reasoning for the solution of many complex orthodontic problems.

If we examine closely the elements of Lundstrom's explanation, we will realize that times have changed. Since 1926, we have made notable advances in orthodontic appliances, but, even with the increased efficiency in attachments and materials, we do not find it possible to bring about every desired tooth movement. This realization places a greater responsibility upon us, in so far as the development of better and newer appliances is concerned, and we constantly are spurred on to look for better appliances. However, the most important implication is that perhaps the failure of many of our cases can be traced directly to our own inability to bring about all the desired changes. This is a deviation from the appraisal of conditions by Lundstrom,

who took the attitude that, with a few exceptions, the mechanical problems of the orthodontists are solved, and that we must explain relapses on an entirely different basis.

The theory of the apical base was accepted without reservations. To a great extent it disproved Angle's contention that in the treatment of orthodontic cases the full complement of teeth must be retained. It further pointed out that, regardless of skill and ability, it is not possible to maintain a normal occlusion of the teeth if a disharmony exists between the tooth material (or alveolar process) and the apical base. This statement had a profound effect on the development of orthodontics as a specialty. It directed our attention to the necessity of extracting teeth, which eventually became established as a legitimate orthodontic procedure.

If we inquire further into Lundstrom's explanation of the apical base it will become apparent that no proof was given of the statement that "the alveolar process and the position of the teeth are dependent upon the form of the apical base. When the latter is normal, and only then, is a normal position and a normal occlusion of the teeth possible." It is true that Lundstrom showed many cases of relapse after the completion of orthodontic treatment, and prolonged retention, purporting to prove that in the diagnosis of those cases, the size of the apical base, and the inherent growth of the jaws was not taken into consideration. His reasoning, however, was conditioned by his own previous pronouncements: (1) "that it has been possible for the operator to perform any orthodontic operations that seemed indicated," and (2) that only when the apical base is normal is a normal position of the teeth possible.

With our present knowledge and experience, we cannot accept the first statement, and there is overwhelming evidence that much work is necessary to perfect even the best of our appliances. Therefore, it can be stated without reservation that *it is not possible to bring about all the desired tooth movements by the appliances in use at the present time.*

It is very important for us to observe that, since this is true, it must have been true when Lundstrom treated those cases which he reported to the First International Orthodontic Congress. It is implied, therefore, that all the desired tooth movements were not performed by him and that the relapse of his cases, in part at least, must have been due to incompleted positioning of the teeth; if that is the case, then the theory of the apical base also must be questioned.

The apical base was defined as "the immediately adjoining section upon which the region that is limited by the apical zone rests or to which it is attached." Accordingly, the apical base is that section of bone which is not resorbed after all teeth are extracted. Fig. 1 shows the mandible at different periods of life, and it is quite interesting to study the difference between the adult mandible with its full complement of teeth and the mandible of old age with all the alveolar process resorbed. The body of the mandible at old age actually represents the apical base by definition, for it is the region on which the alveolar process rested before it was resorbed. The striking difference in size represents the large amount of alveolar bone present during adulthood,

and now the question arises whether the apical base has any effect upon the position of the teeth. The amount of change in the alveolar bone is very small, even during extensive correction, and, since the maximum widening of a jaw seldom exceeds 4 or 5 mm., the amount of bone added to the apical zone on

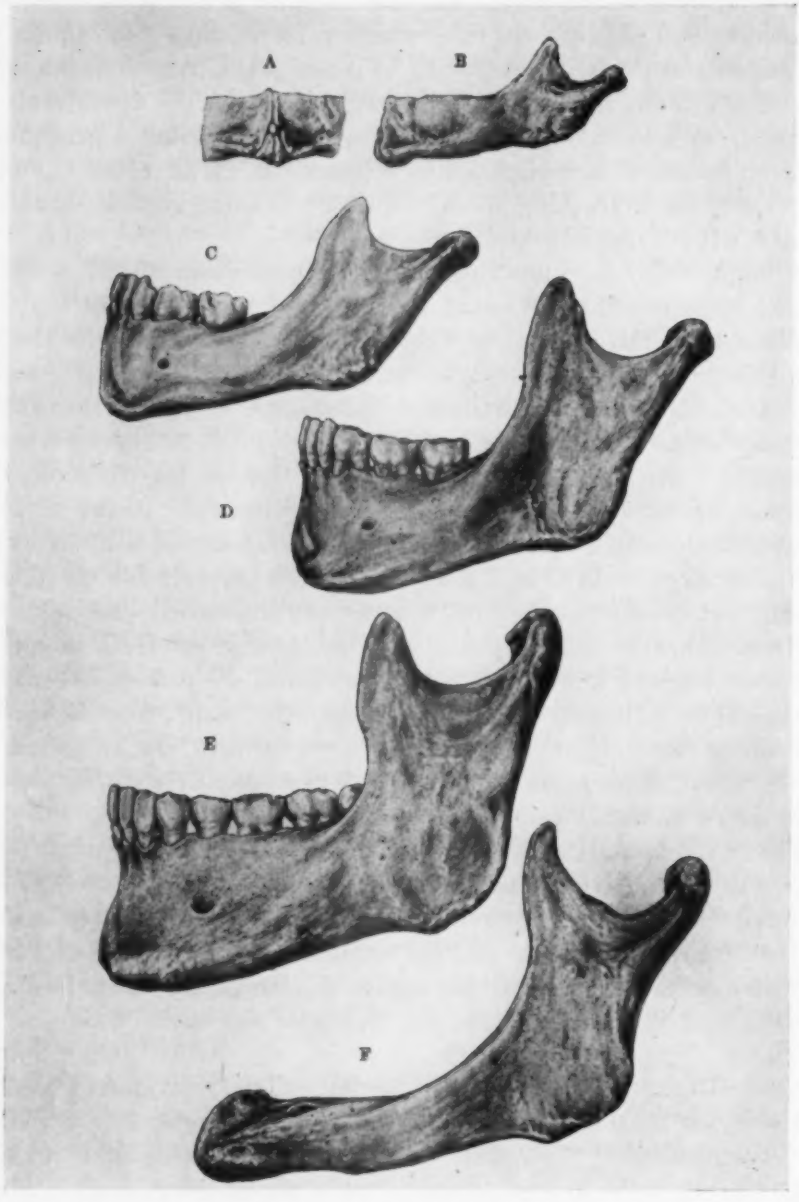

Fig. 1.—The mandible at different periods of life. *A*, At birth; anterior aspect, showing the ossicula mentalia. *B*, At birth; left lateral aspect. *C*, At four years; full milk dentition. *D*, At eight years. The permanent incisor and first molar teeth have erupted; the milk molars are in process of being shed. *E*, Adult. *F*, Old age.

each side cannot be more than one-half that amount, or 2 to 2½ mm. It is difficult to understand why the apical zone cannot be changed permanently by that amount. The apical zone is not identical with the apical base. The

apical zone is a portion of the alveolar process resting on the apical base, which is the hard compact bone making up the body of the mandible. It is not conceivable that the size of the apical base has any influence on the size of the apical zone, within the range of orthodontic operations.

From a purely physical point of view, a smaller or larger amount of alveolar bone may be supported equally well by any given sized apical base, but physiologically this may not be true. The opinion prevails that it is possible for the apical base to be smaller than normal size, but, if at the same time it also is maintained that it cannot be made larger by orthodontic means, then we must inquire whether the comparatively larger amount of alveolar bone developed as a result of establishing normal occlusion is physiologically tolerated.

When we speak of a small apical base, we must have a standard of comparison. This standard of comparison may be the normal sized apical base for the individual, but we have no method by means of which the normal dimensions of the apical base in an individual may be predetermined. In the absence of such a method, we lose all claims to speak of the relative size of the supporting bone, and the theory advanced by Lundstrom must be looked upon as an unconfirmed hypothesis.

There is, however, another point which may be discussed in this connection. There is no proof that the portion of the alveolar process which rests upon the apical base exhibits a different behavior from the more gingival portion of the alveolar bone. We have every reason to believe that the response to orthodontic efforts is the same throughout the entire cancellous structure; therefore, it must be possible to develop the apical zone to harmonize with the orthodontically enlarged coronal zone demanded by normal occlusion.

It still remains to consider whether the stimulus applied to the dental zone by orthodontic appliances also is transmitted to the apical zone. An examination of the action of the various appliances will reveal that nearly all appliances tip the teeth buccally or labially, and no special effort is made to move the teeth bodily in those directions. Inasmuch as the apices of the roots are not moved a proportional amount in the buccal or labial directions, the apical zone of alveolar bone is not developed and remains small in comparison with the expanded coronal zone. It is almost certain that the term *small apical base* is applied loosely to this undeveloped apical zone, and, just because we have not been able to perfect our appliances to bring about the full development of the entire alveolar process, it is held erroneously that the apical zone cannot be enlarged by orthodontic means. Furthermore, is is to be remembered that the term *apical zone* is never used in the literature and that it is incorrectly referred to as the *apical base,* notwithstanding the clear definition given by Lundstrom.

Here, then, we have two conflicting interpretations. One interpretation holds that the apical zone (base) cannot be enlarged by orthdontic means, while the other suggests that, inasmuch as the apical zone is nothing more than cancellous alveolar process, it must respond to orthodontic stimulation very similarly to the alveolar process in the coronal zone. This brings us to a point

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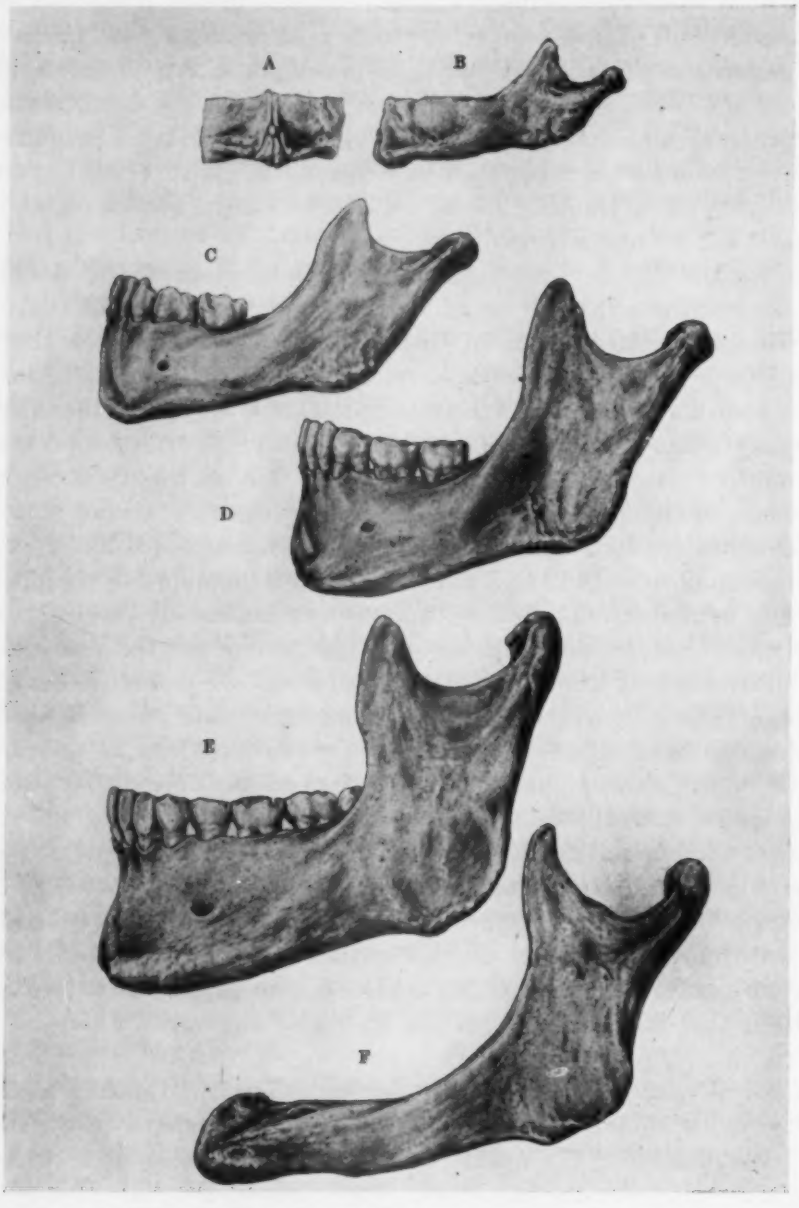

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each side cannot be more than one-half that amount, or 2 to 2½ mm. It is difficult to understand why the apical zone cannot be changed permanently by that amount. The apical zone is not identical with the apical base. The

apical zone is a portion of the alveolar process resting on the apical base, which is the hard compact bone making up the body of the mandible. It is not conceivable that the size of the apical base has any influence on the size of the apical zone, within the range of orthodontic operations.

From a purely physical point of view, a smaller or larger amount of alveolar bone may be supported equally well by any given sized apical base, but physiologically this may not be true. The opinion prevails that it is possible for the apical base to be smaller than normal size, but, if at the same time it also is maintained that it cannot be made larger by orthodontic means, then we must inquire whether the comparatively larger amount of alveolar bone developed as a result of establishing normal occlusion is physiologically tolerated.

When we speak of a small apical base, we must have a standard of comparison. This standard of comparison may be the normal sized apical base for the individual, but we have no method by means of which the normal dimensions of the apical base in an individual may be predetermined. In the absence of such a method, we lose all claims to speak of the relative size of the supporting bone, and the theory advanced by Lundstrom must be looked upon as an unconfirmed hypothesis.

There is, however, another point which may be discussed in this connection. There is no proof that the portion of the alveolar process which rests upon the apical base exhibits a different behavior from the more gingival portion of the alveolar bone. We have every reason to believe that the response to orthodontic efforts is the same throughout the entire cancellous structure; therefore, it must be possible to develop the apical zone to harmonize with the orthodontically enlarged coronal zone demanded by normal occlusion.

It still remains to consider whether the stimulus applied to the dental zone by orthodontic appliances also is transmitted to the apical zone. An examination of the action of the various appliances will reveal that nearly all appliances tip the teeth buccally or labially, and no special effort is made to move the teeth bodily in those directions. Inasmuch as the apices of the roots are not moved a proportional amount in the buccal or labial directions, the apical zone of alveolar bone is not developed and remains small in comparison with the expanded coronal zone. It is almost certain that the term *small apical base* is applied loosely to this undeveloped apical zone, and, just because we have not been able to perfect our appliances to bring about the full development of the entire alveolar process, it is held erroneously that the apical zone cannot be enlarged by orthodontic means. Furthermore, is is to be remembered that the term *apical zone* is never used in the literature and that it is incorrectly referred to as the *apical base,* notwithstanding the clear definition given by Lundstrom.

Here, then, we have two conflicting interpretations. One interpretation holds that the apical zone (base) cannot be enlarged by orthdontic means, while the other suggests that, inasmuch as the apical zone is nothing more than cancellous alveolar process, it must respond to orthodontic stimulation very similarly to the alveolar process in the coronal zone. This brings us to a point

where we must decide which one of these interpretations is correct. If the apical zone cannot be altered, then we must look for the causes of relapse in the disharmony between the amount of alveolar process demanded by normal occlusion, and the available apical base. If, on the other hand, it could be shown that the apical zone responds normally to orthodontic stimulation, then the cause of relapse must be attributed to incomplete positioning of the teeth during treatment. Only one of these interpretations can be correct.

In order to determine which one of these interpretations is more acceptable, let it be assumed that Lundstrom's observations are correct. In that event, a differentiation must be made between cases having adequate and deficient apical zones. In accordance with Lundstrom's recommendations, the full complement of teeth must be retained when the apical zone is adequate, but a variable number of dental units should be removed in case of a deficient apical zone to harmonize the coronal zone with it. This recommendation presupposes the ability of the operator to classify orthodontic cases into two separate groups. The basis of such classification is not quite clear, but granting for a moment that orthodontic cases can be separated accurately into two well-defined groups, still remains to prove that the cases in which extraction is recommended could not be treated without extraction. To prove that, however, we shall meet with insurmountable difficulties.

To continue our line of reasoning, let us further assume that both the extraction and the nonextraction groups of cases are treated without resorting to extraction. If the theory of the apical base is valid, then we may expect a high percentage of successes in the nonextraction cases and a high percentage of failures in the cases where extraction is recommended. The small percentage of failures in the nonextraction cases and successes in the extraction cases represent errors in judgment.

In a practice where extractions are never recommended, all cases are treated with the expectation that the corrections will be successful and, therefore, permanent. The cases are not classified into two categories, but some cases may be distinguished either by the rejection of prior recommendations to have several teeth extracted, or by the fact that they have submitted already to extraction and were treated unsuccessfully. The successful conclusion of such cases may indicate that extractions do not always solve our problems and that reasoning based on a hypothetic apical base is not valid.

Under certain conditions, we may have relapses of treated cases with or without extractions. We may find a ready explanation of this by rejecting Lundstrom's statement that "it has been possible for the operator to perform any orthodontic operations that seemed indicated "and at the same time recognizing the fact that we are not able, even with the most efficient appliances at our command, to arrange the teeth in normal occlusion. The implication here is that, when all active appliances are removed and the case is ready for retention, the correction of the occlusion is not entirely completed. It is most important for us to realize this. The appliances we are working with are so complex in character that it is not possible for us to fully understand their action. As a result, at the conclusion of the active phase of treatment, there

always will be a smaller or larger number of inequities of occlusion. These may range from slight prematurities to actual trauma, and they must be dealt with properly if the newly established position of the teeth is to be retained.

It is believed that, during retention, a settling of the teeth takes place, and thus the occlusion is properly adjusted. This undoubtedly occurs in quite a large number of instances, but the fact still remains that an unduly large percentage of cases relapse after treatment. It is to be remembered that this is equally true in the extraction and nonextraction cases, although perhaps to a different degree.

A critical examination of all forms of retaining appliances will reveal that only vertical adjustments in the position of the teeth may take place as a result of settling. All other changes are resisted by the retaining appliances. Some other changes may take place under the influence of function, but we have no direct proof that this occurs. The important point to recognize is that our retaining appliances retain nearly all the inequities of occlusion which were present at the end of the active treatment and, therefore, it is not difficult to understand the relapse of cases, even after prolonged retention.

Another striking revelation is that not a single retaining appliance is able to hold changes in the position of the mandible. If the occlusal interferences at the end of treatment have a tendency to alter the position of the mandible, a relapse in jaw relationship will always take place. Under such conditions, it is not possible to maintain a normal jaw relationship. The inability to maintain a change in the position of the mandible, especially in Class II, Division 1 cases, led to the design of appliances to bring about the distal movement of the maxillary teeth. This is done in the belief that the occlusion will hold the maxillary teeth in the distal position. Here it must be stated that I also have used a splint with a headgear for the mass distal movement of the maxillary teeth, but I have discontinued its use because now I am convinced that the distal movement of the maxillary teeth is not at all necessary.

The conflicting opinions regarding the retention of orthodontic cases are based upon the factors just discussed. The theory of the apical base has never been proved satisfactorily, and its acceptance may be due to our inability in the past to fully develop the apical zone. The concept of the apical base and the tacit approval of the statement that "it has been possible for the operator to perform any orthodontic operations that seemed indicated" must be contrasted with the observations that it is not possible for any one of us to arrange the full complement of teeth into normal occlusion, and that the retaining appliances retain the occlusal inequities during the period of retention. Lundstrom's concepts definitely justify extractions, while the other observations favor the retention of the full complement of teeth.

It was suggested that the occlusal prematurities be relieved by judicious grinding. However, most of the interferences at the completion of treatment are too much to be cut away, and, with the knowledge that we cannot avoid

them during treatment and cannot correct them during retention, we are faced with a real problem. It may be argued that we must develop greater skill in the manipulation of our appliances to avoid such occlusal inequities. Thus we are again at the point where the skill of the operator may be questioned. With the better understanding of the action of modern orthodontic appliances, it can be shown that it is the appliance that is responsible, and not the operator. Beyond certain fundamental requirements, the skill of the operator is not a factor.

The first ray of hope toward the solution of this perplexing problem came from the Kesling positioner. The principle conceived by Kesling is basically correct and it gives us a reliable method for the adjustment of those occlusal interferences which we are not able to correct by any of our active appliances. From the original Kesling positioner, a new appliance was developed which corrects all occlusal interferences within reasonable limits. Since the new appliance adjusts occlusal inequities, it will be referred to as the *adjuster*. However, this new appliance is much more than a positioner or a retainer. It will take care of slight corrections in tooth positions, it will definitely maintain jaw relationship, and it is capable of developing the apical zone of the alveolar process, notwithstanding the statement made by Lundstrom. Here we may stop to consider the importance of this claim, which at this stage of our understanding is believed to be impossible. The cases to be presented will show, however, that it is possible to develop the apical base (zone) and that even in extreme cases of protrusions, we may obtain a very acceptable esthetic result. It may be mentioned also that there is a great tendency to look upon perfectly normal cases as protrusive when compared with cases treated by extraction. The deficient premaxillary area of such cases now is used as the standard of comparison and, accordingly, nearly all normal cases are looked upon as protrusive. We must not forget that every adolescent child has a protrusive appearance, which in the course of development is adjusted completely to the rest of the face. This adjustment is a part of growing up and it transforms the adolescent into the young adult. The reduction of the premaxillary area by extraction makes the adolescent look like an adult, and it will show up later as a deficiency in the fully developed individual. The tendency is to judge children by adult standards, which is erroneous. It will be shown that by developing the apical zone, the protrusion can be reduced materially, and the teeth which seem to be off the apical base become upright and apparently better supported.

The adjuster was developed from the Kesling positioner and in its final form, it is one of the most useful active retainers. The soft rubber in the original appliance is replaced by a soft plastic material which is encased in a Vitallium framework for strength and support. During its early development, the appliance was made in two parts, one for the upper teeth and one for the lower teeth (Fig. 2). This arrangement, in which the soft plastic was supported by a hard shell of acrylic material, was too bulky for general use. The occlusal surfaces of these appliances had to be quite accurately adjusted

to each other, otherwise the lips could not be closed. The greatest failing of these appliances was that they were not capable of holding the newly established jaw relationships.

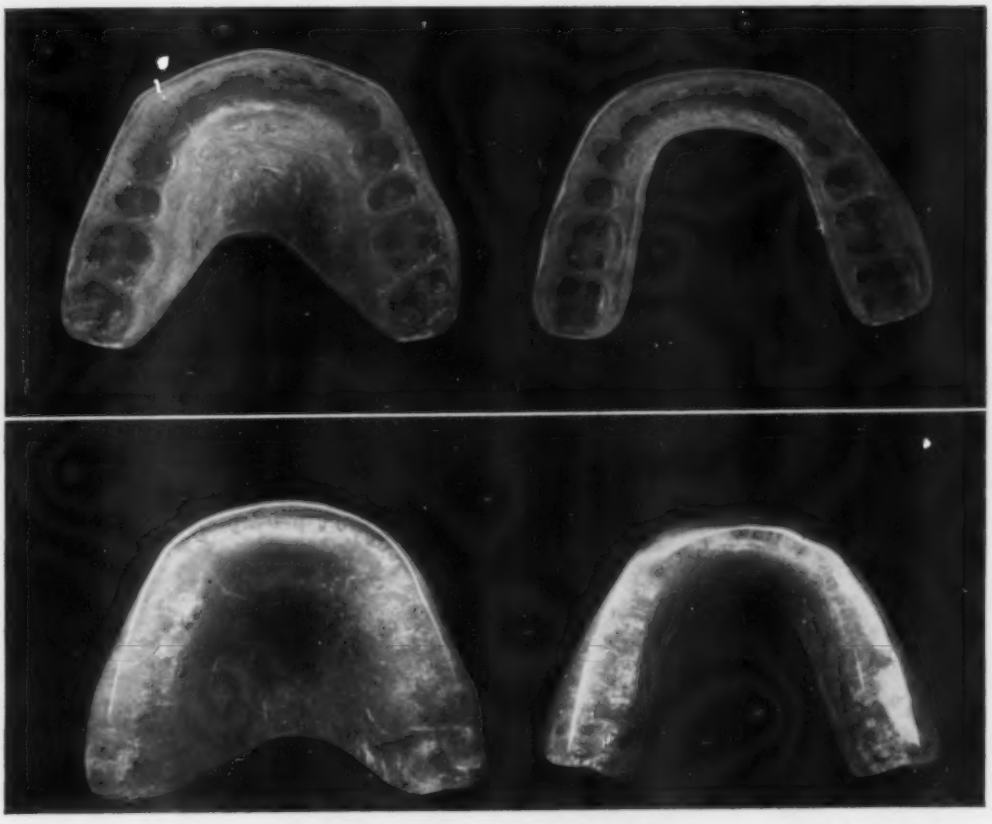


Fig. 2.—Separate maxillary and mandibular adjusters, all plastic.

In a later improvement, these appliances were made in one piece, in such a manner that the upper and lower retainers were attached to each other in normal occlusion (Fig. 3). The supporting acrylic shell is shown in Fig. 4. This arrangement eliminated previous objections and, in this form, the appliance maintained jaw relationship very efficiently. On account of frequent breakages and necessary remakes, it was decided that the hard acrylic shell should be substituted by one made of Vitallium. This stainless steel shell is shown in Fig. 5, together with the completed appliance displaying the soft plastic material in position. This increased the strength and efficiency of the appliance and eliminated repairs. It gives me very great pleasure to say that this is the most valuable appliance I have used during thirty-five years of practice.

The construction of the adjuster may be described briefly as follows:

1. Take one upper and one lower alginate impression. These must include the second molars if present.

2. Pour both impressions in a quick-setting stone. The models thus obtained represent the conditions at the end of the active treatment.

3. Study these casts and note the most evident occlusal interferences. Mark the interfering teeth.

4. By means of a fine jeweler's saw, cut off the interfering teeth from the models and study the occlusion again.

Fig. 3.

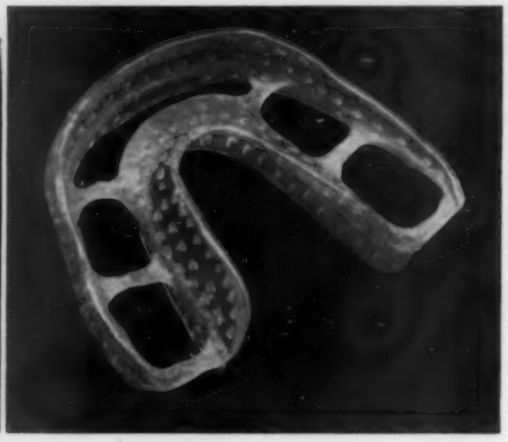


Fig. 4.

Fig. 3.—All plastic one-piece adjuster.
Fig. 4.—The supporting acrylic shell.

Fig. 5.—Vitallium shell and the finished Vitallium adjuster.

5. If there is more interference, remove the offending teeth from the models and repeat the operation until the teeth remaining on the models can be placed into good occlusion without further interference.

It must be noted here that this is an extremely important part of the procedure. This is still orthodontics and it must not be relegated to a technician. The added amount of work will be fully compensated for by a better understanding of occlusion and a fuller appreciation of the limitation of the working appliances. It is quite important to mention that since I began the use of these appliances there was not a single case in my practice that did not require some adjustment of occlusal interferences.

6. Prepare the teeth, which were cut from the models, the same way porcelain teeth are prepared for the Davis crown or bridgework. Drill a hole in the

bottom of each tooth to insure a better hold of the wax on the teeth. Prepare the base of the model where the teeth were removed in a similar way.

7. Wax up the case and arrange the teeth in the most desirable position (Fig. 6). Disregard the apical base entirely and give the proper labial inclination to the anterior teeth. It is quite interesting to note that on many occasions it may seem that it is not possible to arrange the teeth on the available base. Almost invariably, however, a change in the axial inclination of the anterior teeth will enable us to set up the teeth in a space which does not seem large enough to accommodate them.

Fig. 6.—The corrected occlusion. Teeth are set up in wax to eliminate occlusal inequities.

Fig. 7.—The articulated models showing the soft portion of the appliance in Aluwax.

8. After the waxing is neatly smoothed and finished, take an impression of the new setup, and pour it in quick-setting stone. Articulate the models in a plane line articulator.

9. By means of the set screw, open the bite on the articulated models equal in amount to one thickness of wax. Outline the proposed shape of the appliance with a pencil. The edges of the completed adjuster should reach just ½ mm. beyond the highest cervical point of the teeth. Wax up the soft portion of the appliance with one thickness of Aluwax (Fig. 7). Guided by an articulating paper, scrape off the wax from the occlusal portion until the articulator closes the full amount determined by the set screw. It makes no difference if the tips of the cusps are exposed. The important thing is not to have too much soft material in the appliance.

10. The setup thus prepared is sent to a laboratory for casting the Vitallium base. For the casting, 26 gauge wax is used and appropriate retention is provided along the edges and inside the casting. The occlusal portion is free except for a few crosspieces connecting the labial and lingual parts of the appliance.

11. The casting is returned with the setup and the soft plastic is processed into the Vitallium base by the usual laboratory methods.

The adjuster is to be worn by the patient throughout the night. It should be inserted a half-hour before retiring and worked slowly into position. For the greatest efficiency, the appliance must be fully seated. This may not be possible during the first few nights, but if a persistent effort is made, it can be pressed into position after the third or fourth night. Biting exercises for one-half hour before retiring are recommended, and the more faithfully these instructions are carried out, the quicker will normal occlusion be established.

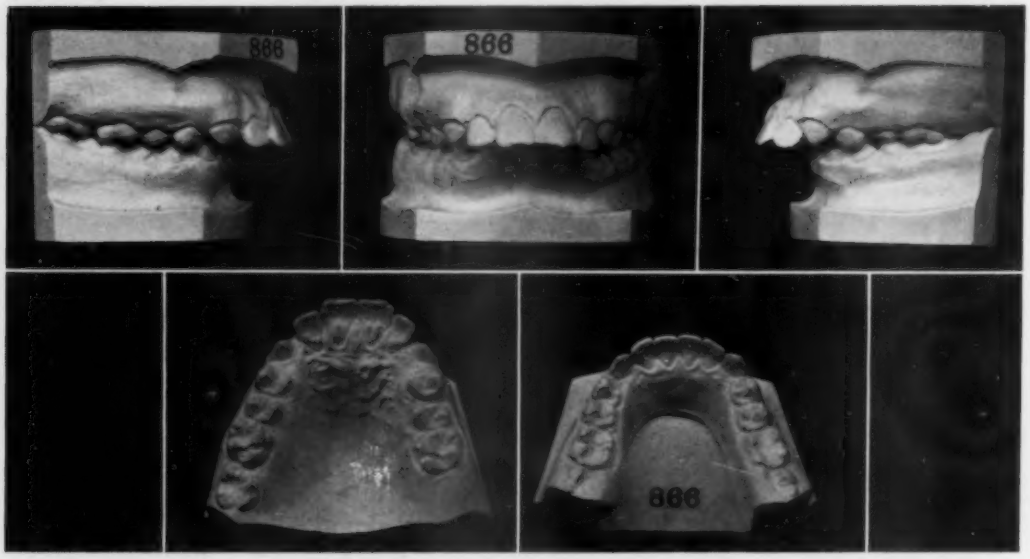


Fig. 8.—A marked Class II, Division 1 case which was unsuccessfully retained for six years.

It is possible to tell whether the patient is cooperating or not from the appearance of the teeth. The action of the appliance is so positive that beneficial changes must take place, even if the appliance is worn only during a part of the night. It also may be mentioned that the adjuster solves the problems of mouth breathing, thumb-sucking, and snoring, and it completely eliminates the problems of jaw relationship and overbite.

To demonstrate the effectiveness of the adjuster, and to illustrate the points brought out in this discussion, I have selected a number of cases from my practice.

The first case (No. 866) will illustrate that occlusal interferences may be responsible for the instability of completed orthodontic cases (Fig. 8). The correction of this case was started on April 8, 1946, and was completed on Sept. 23, 1947. It was a marked Class II, Division 1 case, with a well-developed lower jaw. The patient was very cooperative

and wore maxillary and mandibular bite plates as retainers full time for the first year and during the night for the rest of the time. By the usual means of retention, there was a definite relapse of jaw relationship. This case was under retention for six years.

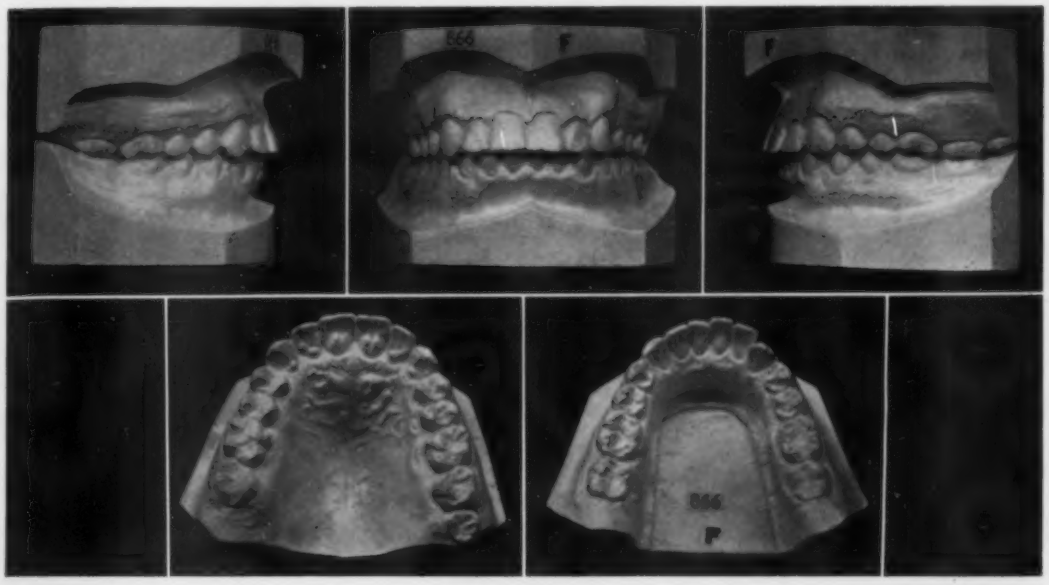


Fig. 9.—Case shown in Fig. 8 after five months' use of an all plastic adjuster.

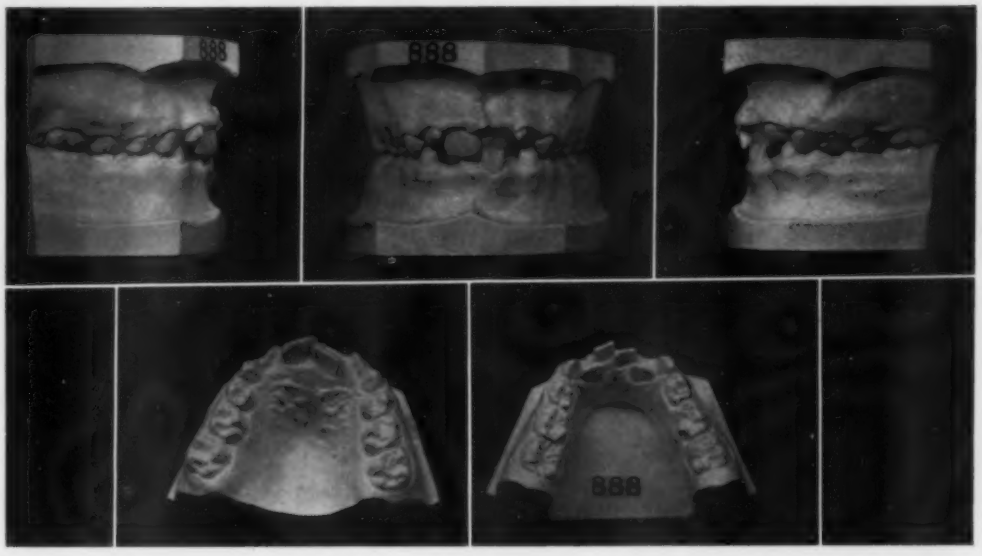


Fig. 10.—Case 888. Class I case in which the left maxillary central incisor was brought into better position. No other correction was undertaken.

On July 21, 1952, an all-plastic adjuster was given to the patient. There was an immediate improvement and on Dec. 29, 1952, about five months later, the condition was as shown in Fig. 9. The jaw relationship is well established, and the patient is not able to bite in the original distal position. By eliminating the occlusal interferences, this case became stable.

Case No. 888 belongs to Class I. Fig. 10 represents the condition on Sept. 12, 1945. The left maxillary central incisor was brought into position, but no other correction was undertaken at that time. The patient returned on March 1, 1951, with the condition shown in Fig. 11, which indicates the self-correction of the mandibular incisors. The occlusion was normal except that the lingually placed maxillary canines were unerupted. They were surgically exposed about six months before these impressions were taken. Modified edgewise arch appliances were inserted on March 14, 1951, and were removed on Oct. 3, 1952. The Vitallium adjuster was given to the patient on Nov. 1, 1952, and the models

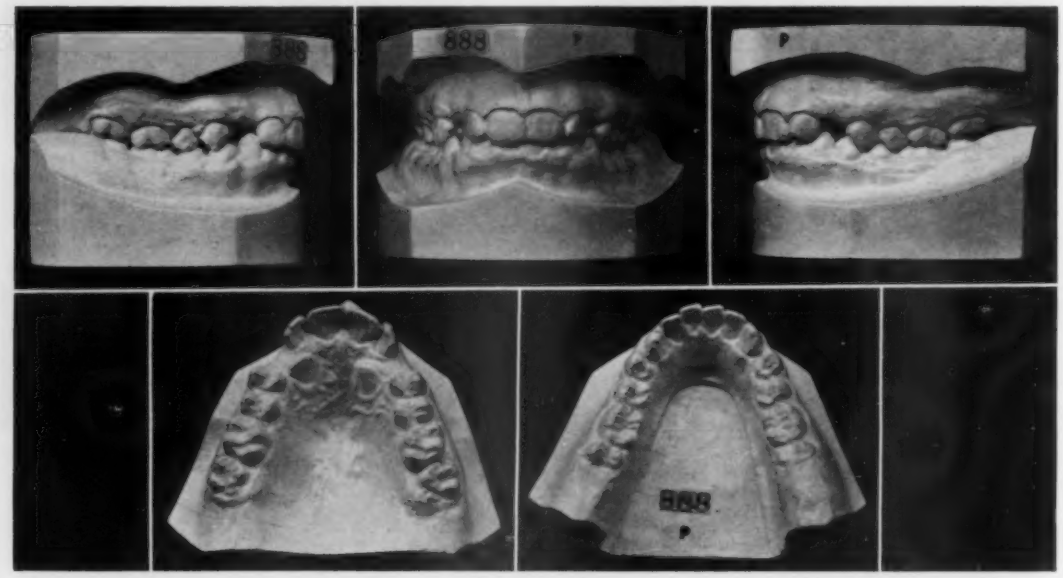


Fig. 11.—Case 888, five and one-half years later. Note self-correction.

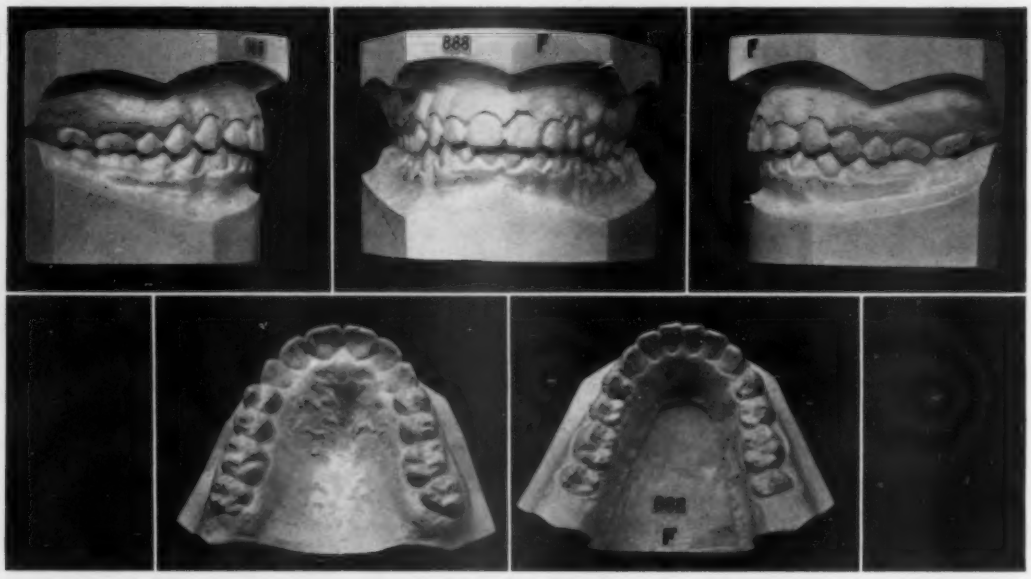


Fig. 12.—Case 888 after correction.

shown in Fig. 12 represent the case on Jan. 3, 1953, just two months later. It is to be remembered that the correction of this case is still going on and, with the passing of time, still better relationships will be established. This is a perfectly normal case and it is very instructive to observe the premaxillary area and the axial inclination of the anterior teeth. The early treatment of this patient would not have affected the time required to bring the maxillary canines into position.

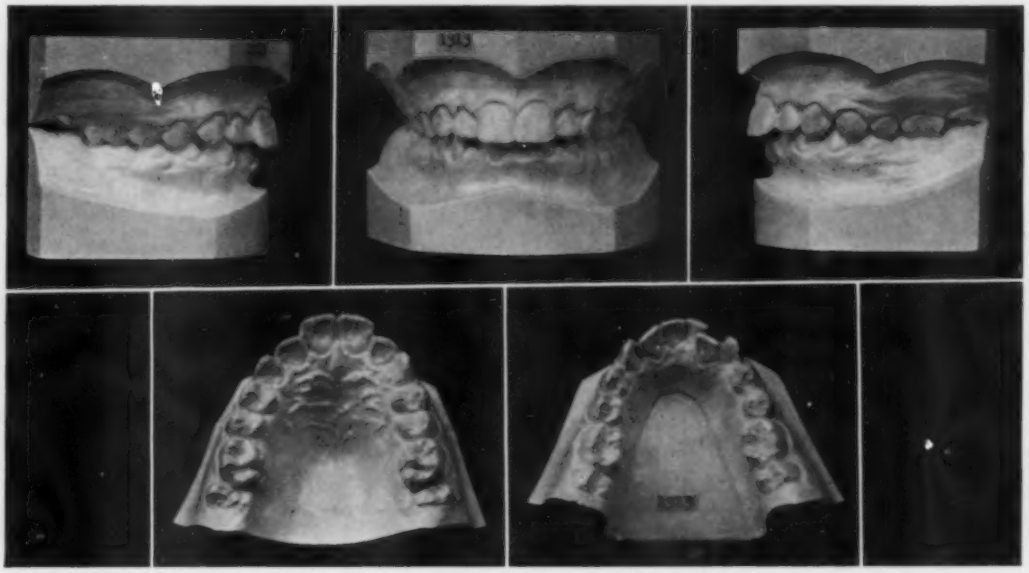


Fig. 13.—Case 1313, a Class I case, before treatment.

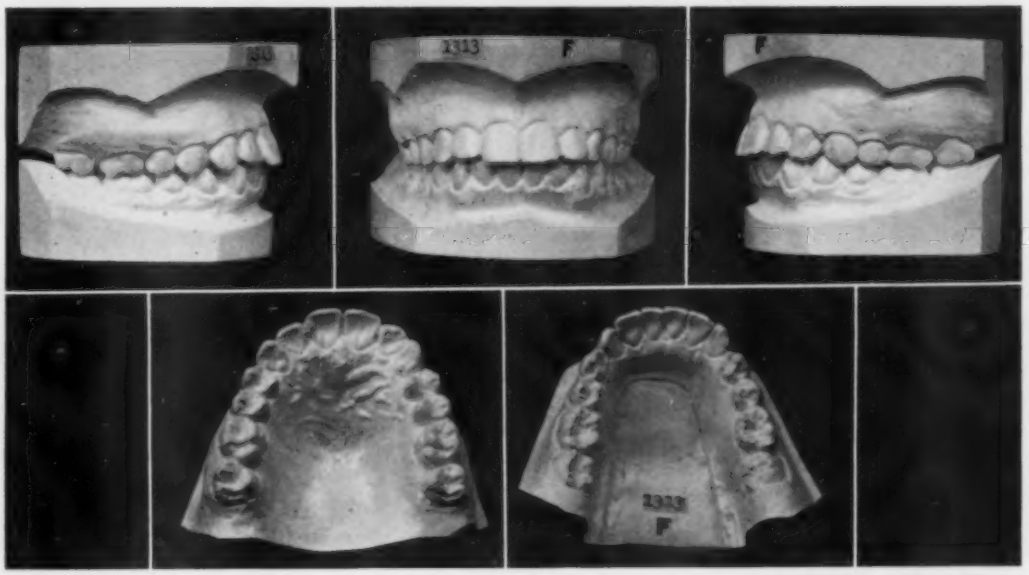


Fig. 14.—Case 1313 after treatment. Note the greater labial inclination of the maxillary anterior teeth.

Case No. 1313 is still another Class I case which is somewhat different from the previous Class I cases presented. Fig. 13 shows the case on Jan. 25, 1950. Modified edgewise arch appliances were inserted on Feb. 3, 1950, and were removed on May 17, 1952, making

the length of active treatment twenty-seven months. This is much too long a time for a simple case of this kind, but the response was very slow in spite of the fact that the patient was very cooperative. A Vitallium adjuster was inserted on June 7, 1952, and the condition on Jan. 3, 1953, is shown by Fig. 14. The striking things about this case are the increased labial inclination of the maxillary anterior teeth and the lack of development

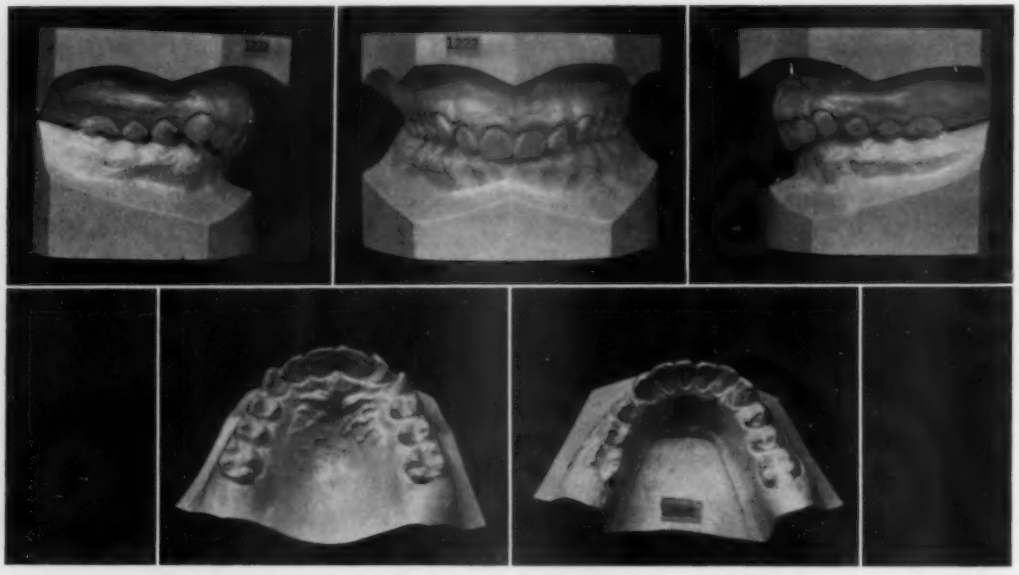


Fig. 15.—Case 1222, a Class II, Division 2 case, before treatment.

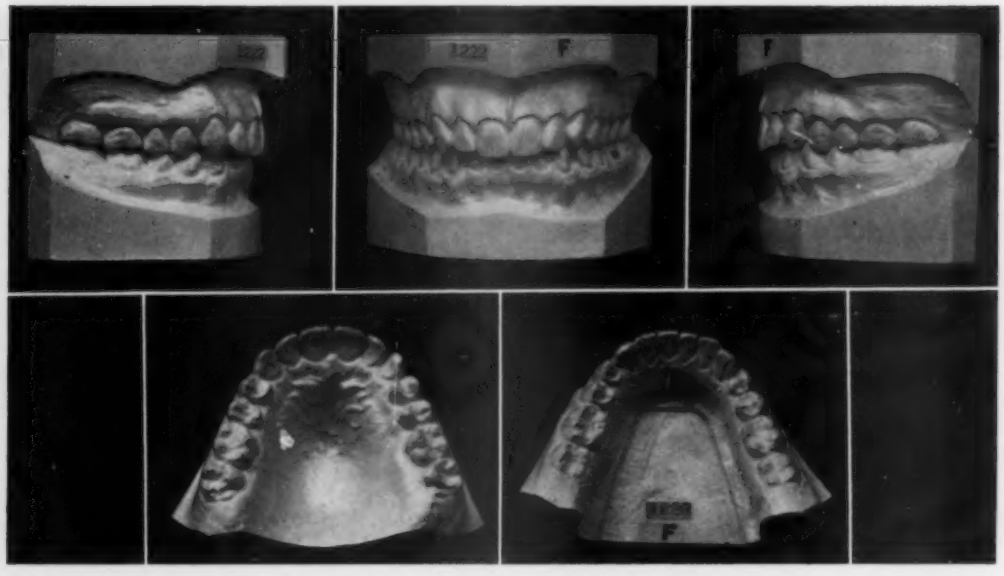


Fig. 16.—Case 1222 after treatment.

in the apical zone. At the beginning of treatment, this was not apparent and there was nothing during mechanical treatment that could induce the increased labial inclination of the maxillary anterior teeth. I never use stops on the arch wires in front of the buccal tubes, and in this case coil springs were not used on the upper teeth. The spaces for the

lower anterior teeth were created by means of coil springs, but they seem to be well on the ridge and better positioned than the maxillary anterior teeth. To make things less understandable, this patient wore Class II intermaxillary elastics for four months, which is much longer than necessary in the average Class II case.

In the lawless behavior of this case, I see only a confirmation of my belief that, during growth, the entire dental arch moves forward through the bone to make room for the erupting second and third molars. This child is a little over 14 years of age and is just going through adolescence, with a vigorous body growth. I have every reason to believe and to expect that, after a reasonable length of time, the axial inclination of the maxillary incisors will change and the apical zone will be developed better under the influence of the adjuster. Esthetically there is nothing to be desired and the appearance of the teeth is more than satisfactory. In this case also, correction still is going on and the case is not yet completed.

The Class II cases present a somewhat different problem, where the jaw relationship must be changed permanently. As it was pointed out, none of the retaining appliances used at the present time hold the change in the position of the mandible. For this reason, many believe that the mandible is always in its correct position and the maxillary posterior teeth must be moved distally. From the discussion of the previous case, it follows that even if that is carried out properly, the entire maxillary arch must come forward during growth. On account of this very definite growth factor, I have discontinued the distal movement of the posterior teeth in all my cases, with the exception of those in which a slight distal movement on one side may establish a better symmetry.

Case No. 1222 is a Class II, Division 2 case. The original impressions were taken on Jan. 11, 1949, but treatment was initiated almost a year later. The modified edgewise arch appliances were inserted on Nov. 18, 1949, and removed on Sept. 6, 1951. Separate upper and lower all-plastic adjusters were made on Oct. 17, 1951, and the finished models (Fig. 16) represent the occlusion on Dec. 31, 1952. The remarkable point in connection with this case is that separate adjusters were used but, in spite of that, there was no relapse of the distal relationship. The removal of the occlusal inequities may explain this. The premaxillary area seems normal.

Case No. 1319 is a Class I case having a right maxillary deciduous lateral incisor in position. The permanent lateral incisor is absent. The original models are shown by Fig. 17, and clearly display the crowding in both the maxillary and mandibular anterior regions. The impressions for these models were taken on Feb. 13, 1950, and immediately after that the deciduous tooth was removed. Modified edgewise arch appliances were inserted on April 10, 1950, and were removed on Sept. 8, 1952. The Vitallium adjuster was given to the patient on Oct. 4, 1952, and the final impressions were taken on Jan. 3, 1953 (Fig. 18). The adjuster was worn for three months.

Please note the alignment of both the upper and lower anterior teeth and observe the relationship of the posterior teeth on the right side. The entire right maxillary posterior section was moved forward. The lower anterior teeth are upright and the premaxillary region is well developed. In time, a better correction of this case is expected.

It still remains to consider those cases in which previous recommendations were made for the extraction of four teeth as the only means of correcting the existing malocclusion. All these were treated without extraction with good results.

Case No. 1318 is the first one of such cases. The original impressions were taken on Feb. 2, 1950, and the models made from these are shown in Fig. 19. This case was characterized by an extremely narrow arch, crowding of the upper, but especially the lower,

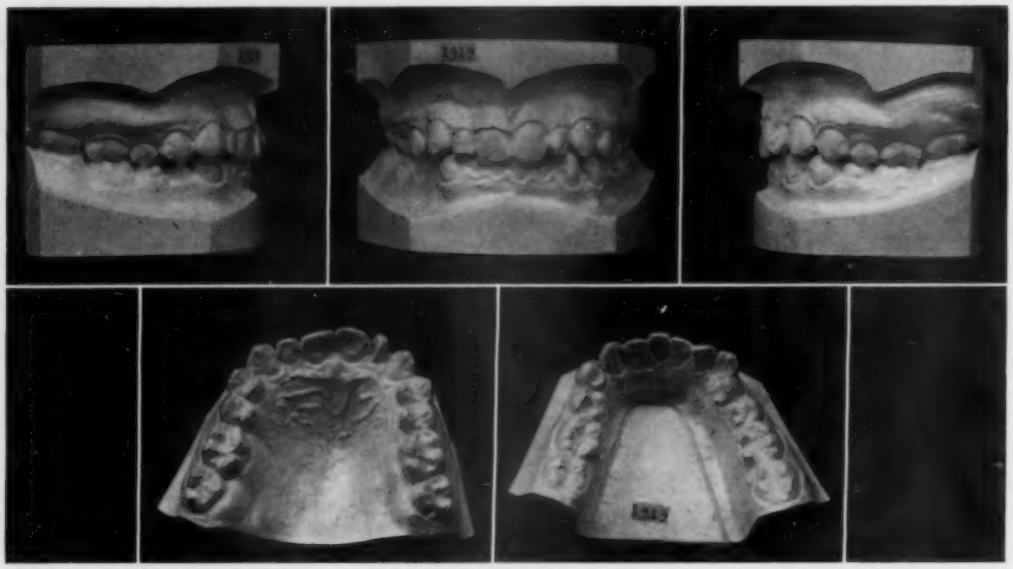


Fig. 17.—Case 1319. Class I case complicated by a congenitally missing right maxillary lateral. Before treatment.

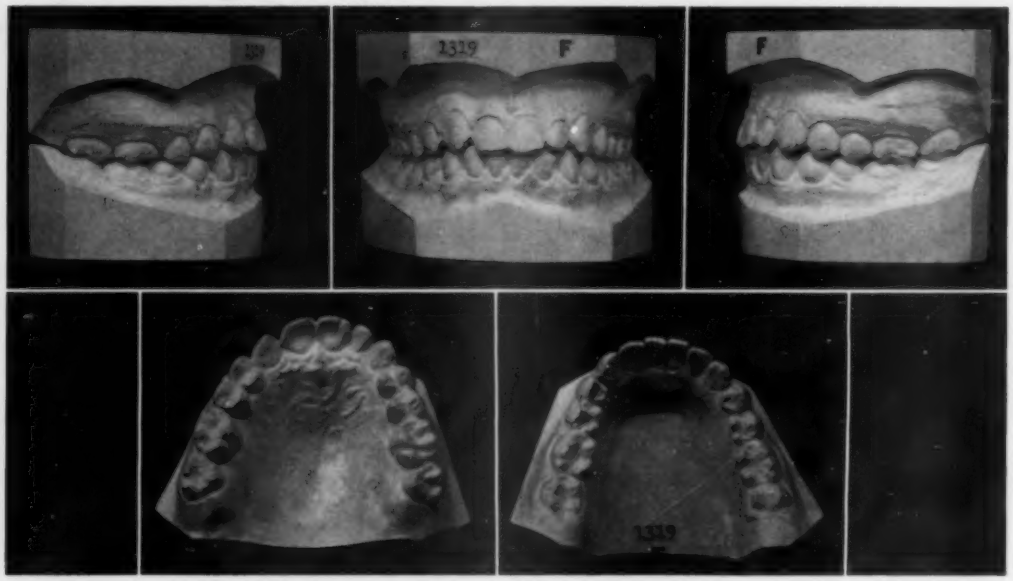


Fig. 18.—Case 1319 after treatment.

anterior teeth, and normal molar relationship. The alveolar bone in the lower anterior region was very thin and the prediction was that when the teeth are straightened, they will be pushed off the basal bone. This case was complicated further with an impacted right maxillary canine. This tooth was surgically exposed and later it erupted lingually.

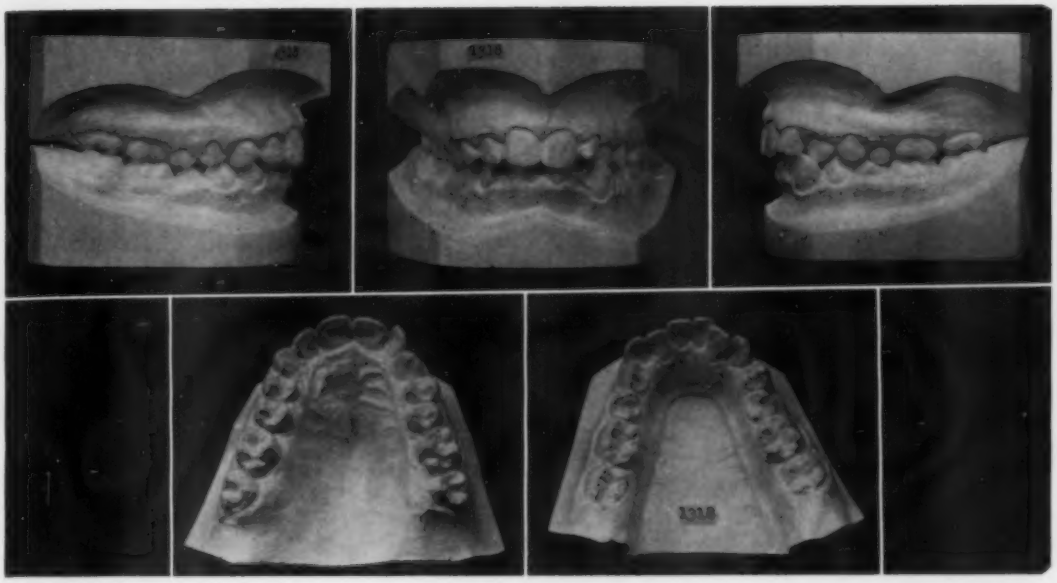


Fig. 19.—Case 1318. Class I case in which the removal of four second premolars previously was recommended. Before treatment.

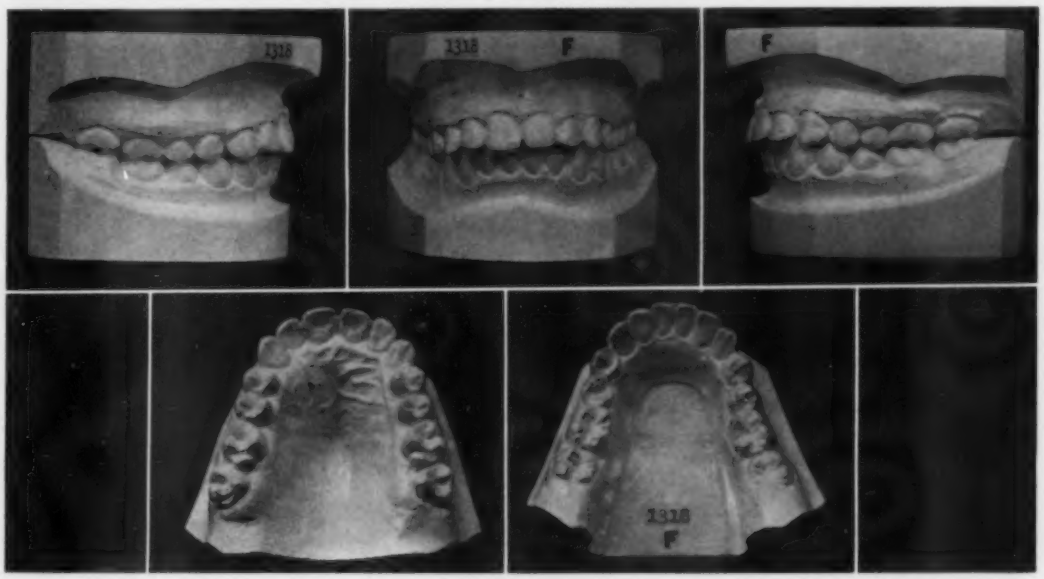


Fig. 20.—Case 1318 after treatment without extraction.

Fig. 21.—Case 1318. Photographs of patient after treatment.

The modified edgewise arch appliances were inserted on March 1, 1950, and removed on Sept. 9, 1952. The Vitallium adjuster was given to the patient on Oct. 2, 1952, and the impressions for the final models were taken on Jan. 14, 1953. The adjuster was used for three months at that time.

When the active appliances were removed, both the upper and lower teeth were very protrusive. The canines were too prominent and the lower anterior teeth inclined labially, and were actually pushed off the ridge. Under the influence of the adjuster, however, the condition shown in Fig. 20 was established. The protrusion begins to disappear, the lower anterior teeth are uprighted, and, in general, the occlusion was improved. It is well to take into consideration that this case is not yet finished and that the continued use of the adjuster must bring about further improvement. Eventually, this case will be offered as conclusive evidence that the apical base can be developed by orthodontic means. Even today, the appearance of the patient justifies the treatment (Fig. 21, *A* and *B*).

Case No. 1264 is another case in which treatment was refused previously because the patient did not submit to the extraction of four premolar teeth. The original models represent the case on Sept. 21, 1949 (Fig. 22). The upper and lower modified edgewise arch appliances were inserted on Sept. 30, 1949, and removed on March 11, 1952. The patient began to wear the Vitallium adjuster on April 7, 1952, and the final impressions were taken on Jan. 7, 1953. Incidentally, this is the first case in which Vitallium was used. Please note the crowding of the lower anterior teeth and the inclination of the uppers.

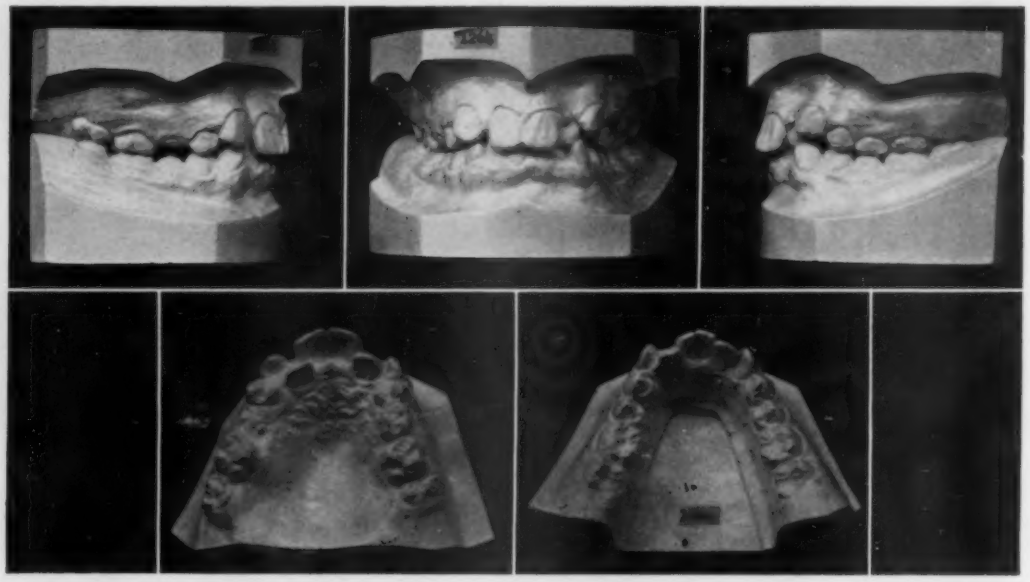


Fig. 22.—Case 1264. Another Class I case in which the extraction of four second premolars was recommended. Before treatment.

This case was also very protrusive when the active appliances were removed, but during the nine months the adjuster was worn there was a gradual readjustment of the surrounding structure, with the result shown in Fig. 23. At present, there is no sign of protrusion and, while the inclination of the maxillary anteriors is not quite as good as I would like to see, it is possible that in time a much better adjustment will take place. In the event that the case will not show further improvement, the plastic portion of the adjuster may be remade to replace the old material which may have lost its resiliency. It is certain, however, that the apical base in this case was developed. There is no pro-

trusion and the appearance of the premaxillary area should be kept in mind, so that we may compare it with that of the following case. The patient's photographs are shown in Fig. 24, *A* and *B*.

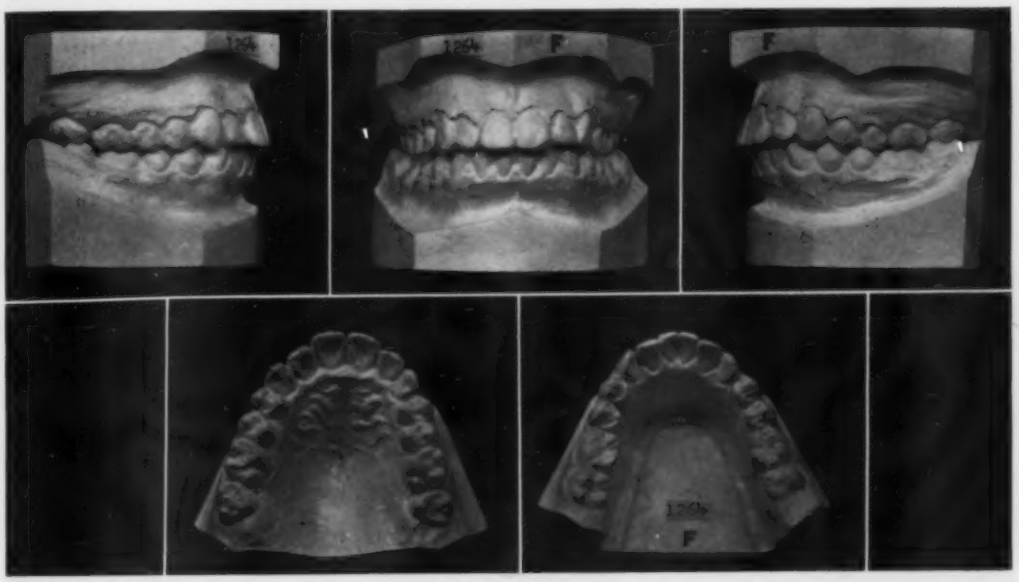
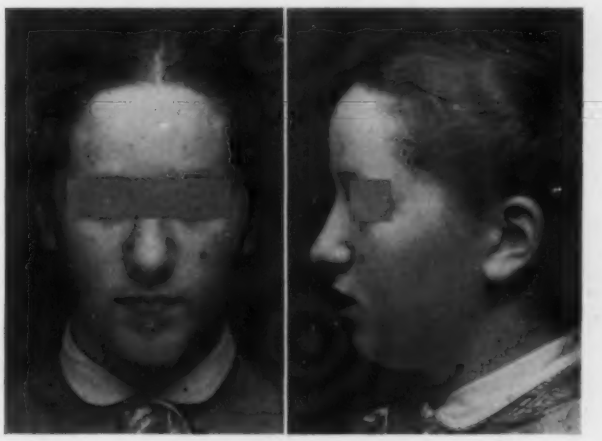


Fig. 23.—Case 1264 after treatment without extraction.



A. *B.*

Fig. 24.—Case 1264. Photographs of patient after treatment.

Case No. 1057 is distinguished by four congenitally missing second premolars, complicated by very small but not quite peg-shaped laterals. This is a good equivalent of an extraction case and was treated with apparent good result. The original impressions were taken on Jan. 8, 1948 (Fig. 25). The modified edgewise arch appliances were inserted on May 3, 1948, and removed on March 10, 1951. Separate all-plastic adjusters were given to the patient on March 31, 1951, and the final impressions were taken on Dec. 12, 1952 (Fig. 26).

The finished models indicate that a fairly acceptable result was obtained. On account of the small laterals, there is some spacing of the maxillary anteriors. The lower

and upper anterior teeth are uprighted and the premaxillary region is very much reduced. It must be noted here that this is the type of finished case held out to us as an ideal result, and anything beyond that is looked upon as protrusive. If this is compared with all the cases previously shown it represents a deficiency, and I am convinced that it is nothing

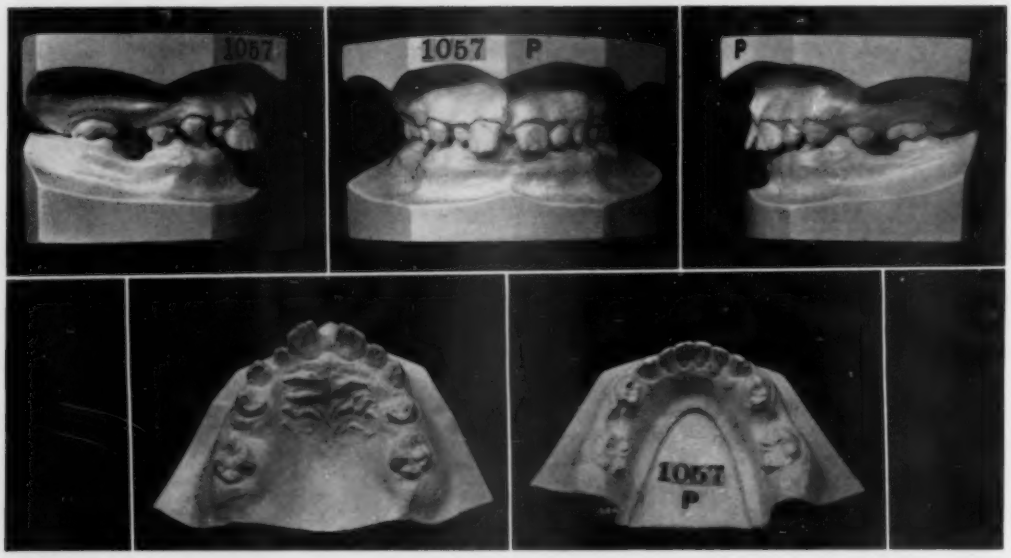


Fig. 25.—Case 1057. Class II case with missing four second premolars. Before treatment.

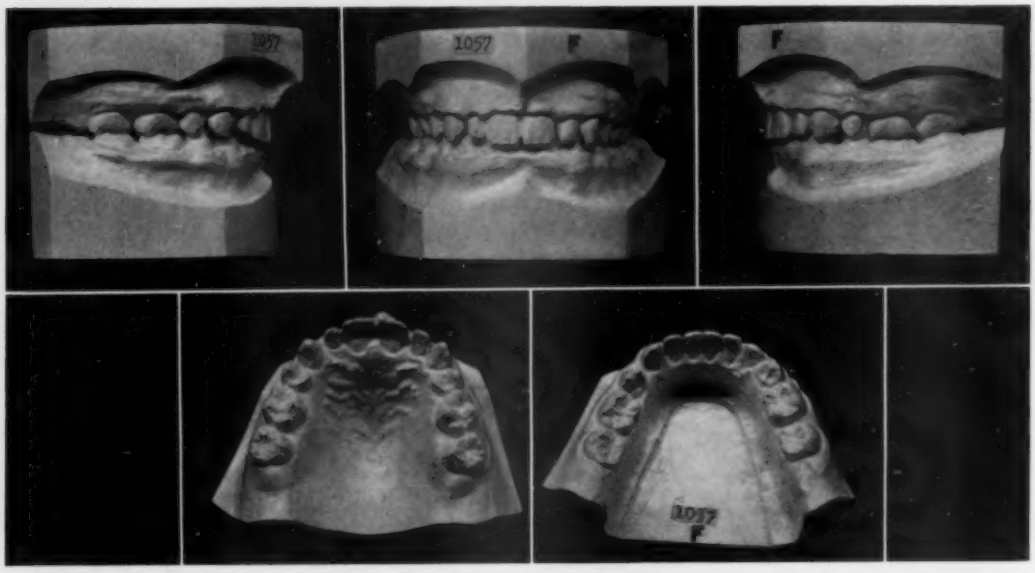


Fig. 26.—Case 1057 after treatment.

more than a mutilation when it is brought about by extraction. Even the photographs of the patient (Fig. 27, *A* and *B*), show that there is a suggestion of the edentulous in this profile, although it is looked upon as the real American type.

It is too early to draw conclusions regarding the permanency of the results brought about by the use of the adjuster. It is certain, however, that

it enables us to finish our cases more accurately, with a much better development of the apical zone. The striking point in this presentation is the fact that a large number of good results were shown. The question well may be asked, "Are these results permanent?" It is not possible to answer this question in the affirmative, but since our cases can be finished better, the patient will be left with a better occlusion at the conclusion of treatment. If, before final dismissal, the fine adjustments in occlusion are made by judicious grinding, then it will be more likely that the results will be permanent.

In the event of a relapse, after the best possible occlusion has been established and retained for a reasonable length of time, the failure of the case must be attributed to some other causes, which are not in any way dependent on normal occlusion. Just what these forces are, we are not in a position to say, but in the absence of a positive proof we cannot accept the concept of the

A. *B.*

Fig. 27.—Case 1057. Photographs of patient after treatment. Note deficient profile.

apical base, for its acceptance established extraction as a legitimate orthodontic procedure. The rejection of the concept of the apical base and all its implications would stimulate research along much broader lines. The successful treatment of those cases in which extraction was recommended but not carried out seems to indicate that with our present facilities, it is not possible to separate orthodontic cases into two well-defined groups, and to designate, with any degree of exactness, those cases which must be treated by extraction. Until a definite diagnostic method is devised, we have no moral right to recommend extraction in any case. It is to be remembered that good results were obtained without extraction in several cases shown, notwithstanding the fact that recommendations for extractions were made previously. This becomes even more significant when it is realized that the whole question of extraction is justified by an assumed disharmony between the alveolar bone and the supporting apical base. Apart from the relapse of many treated cases, not a single proof is offered to verify this disharmony. The burden of proof still rests with those who accept the concept of the apical

case, that the relapsing cases offered in evidence were properly treated and properly retained. And it also must be shown that the cases treated by extraction are more stable and that the results are more desirable.

On the other hand, we have just seen a number of cases in which very acceptable results were obtained without resorting to extraction. They demonstrate without doubt that the apical zone can be developed by orthodontic means. The occlusion obtained by the adjuster is superior to anything we have been able to obtain in the past, and, if good occlusion is a criterion for stability, we may expect much fewer relapses. According to all basic teachings in orthodontics, the aim of all orthodontic operations is to establish normal occlusion. If our cases fail after normal occlusion is established and properly retained, then we well may question the very importance of orthodontic service and its benefits to the patients. If the results of our treatments are not permanent, the specialty of orthodontics will not endure.

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654 MADISON AVE.

TEAMWORK BETWEEN SCHOOL AND HEALTH SERVICES

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IN ACCEPTING your president's generous invitation to participate in this afternoon's program, I was well aware of my ignorance of the many and varied aspects of problems which affect you, as members of a professional group. In one respect, the members of this society enjoy an advantage not possessed by me: whereas I know practically nothing about your profession, you know a great deal about mine. My contacts with the problems which you meet constantly are vicarious and casual. Your contacts with the problems of schools and school administration are more constant and direct. This is true, I believe, by reason of the fact that you, as citizens, as parents, as taxpayers and, in many cases, as members of Boards of Education or other educational groups, are directly involved in the policies and procedures of our educational institutions. I refrain, therefore, from indulging myself in the luxury of attempting to discuss matters about which I know little or nothing. My remarks will be entirely nontechnical.

Each of us stands on the common ground of mutual interest in those with whom we deal day by day—our children. The boys and girls whom you serve as patients are the same boys and girls whom we, in the schools, serve as students. We are dealing constantly with the same human material. However different may be the specific relationships existing between you and your patients, on the one hand, and between the schoolmaster and his students, on the other hand, there is a conjunction of interest between us when we are dealing with the same individuals. Basically our interests are the same because our ideals of service, as professional persons, are basically the same. Certainly this common denominator of interest and purpose suggests the wisdom of teamwork between us.

There are many ways through which to express this commonalty of interest and purpose. Stated in simple terms, we seek to promote by all reasonable and available means the optimum development of each individual whose future lies, in some degree, in our hands. To promote this optimum development, we constantly strive to provide the best conditions for such development. We are mutually concerned with promoting such optimum development in each of the varied aspects of human growth—moral and spiritual strength, social usefulness, intellectual vigor, physical well-being. Each of us has an obligation to be concerned with each of these sides of human development, even though our unique contribution to one of them may be greater than to any of the others. Historically, schools have been concerned

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with moral, spiritual, and intellectual growth more particularly than they have with physical growth, physical vigor, and personal or group health. The recognition of responsibility for such matters as health, hygiene, and safety, on the part of our schools, has been a relatively modern development. The general recognition and acceptance of this responsibility, being relatively more recent than the acceptance of comparable responsibilities in other areas, means that schools as a whole have not yet developed the same degree of effectiveness in applied techniques as is the case in most other areas of our school program.

I shall not bore this audience by attempting any documented recapitulation of historical developments in this area of our schools' program. It is sufficient, I think, merely to observe that our modern schools are increasingly aware of the importance of sound health for our boys and girls and, that this consciousness is being reflected increasingly in many ways. Statutory legislation within our several states reflects it; local school health programs indicate it; school physical facilities are designed to support it; new courses of instruction, trained personnel, and varied health services give evidence of it. Despite such significant and encouraging developments, however, it remains true that the identification, diagnosis, treatment, and cure of individual physical and health disabilities remains the principal responsibility of individual families and private practitioners. This is true even though the range and availability of public health services has been expanding constantly in recent years. Generally speaking, while schools play an increasing role in promoting sound individual and group health, their particular role lies in the fields of health information and instruction, screening physical examinations, limited clinical services, general counseling services to students and parents, first aid, and safety, rather than the field of diagnostics, treatment, and cure. If this be the case, it seems wholly obvious that effective promotion of individual and group health must include effective cooperation and teamwork between schools and health services. For the purposes of my further discussion, I shall limit my remarks in two ways: first, teamwork between schools and private practitioners; second, some specific methods employed by a specific school in promoting this teamwork.

Allow me, then, to make a few general observations.

First, if schools accept their responsibilities for promoting sound health and if the necessary health services are predominantly available through private practitioners, schools must concern themselves with the development of mutually agreeable and possible working relationships with those engaged in private practice.

Second, this understanding and resultant working relationships cannot be developed by either the school alone or by private practitioners alone, nor indeed by private practitioners working solely as individuals. It is a two-way, reciprocal relationship requiring cultivation from each end of the row.

Third, schools must beware of unrealistic emphasis on the laudable desire to avoid the use of school time and school personnel, paid for at public ex-

pense, for the primary benefit of private practice or, if you will, private gain. This general policy, while undoubtedly sound, can be carried to the extreme of refusing cooperation where it is desirable and is not in conflict with sound policy. This is an area in which the school administrator must exercise discretion and sound judgment. At the same time, you who are engaged in private practice must not be guilty of adopting a policy of hands off, to the extent that schools are left without adequate information or sound understanding.

Fourth, the development of teamwork between schools and private practitioners requires, as a prerequisite, the prior development of teamwork within the school organization and between the private practitioners themselves. Within the school, this requires an understanding by all levels of responsible personnel of the policy and procedures of the school, to the end that desirable procedures are not hindered or defeated by reluctant support within the school. As regards the private practitioners, there is an equal need for common agreement with respect to those procedures which are regarded as most effective in promoting cooperation. I need not labor the obvious point that lack of such common agreement among private practitioners, as a group, presents the school with a difficult administrative problem since, as an organization, it must have some point of reference that is general, rather than become the victim of exaggerated individual differences.

Fifth, since this group deals primarily with children, the effectiveness of whatever means of cooperation may be developed with schools will depend in the last analysis on the understanding and cooperation of parents. The channels of communication, then, must include the triangle, *private practitioners, parents,* and *school.* The responsibility for establishing this triangle of communication is reciprocal, and can be maintained only if the school and private practice team up in the dual task of working out procedures and in explaining such procedures to parents.

Sixth, we must always keep in mind the importance of balance in the total program and activities of the child. Our teamwork is not directed to personal, selfish ends. It orients itself around the needs of the boy or girl. While we recognize the necessity of making choices, it should be our adult responsibility, in so far as possible, to avoid presenting children with the hard necessity of making choices between two equal obligations or loyalties. Emergencies will arise which require such choices to be made, but in planning effective teamwork, we cannot afford to risk its defeat by ignoring the fact that boys and girls are individuals and that their interests can be served best when we maintain flexibility in the program. Balance for the individual can be found best, I believe, when the procedures are flexible enough to permit of adaptations *between individuals* and *for the same individual under varying circumstances.*

I turn now to a summary of specific policies and procedures which, in a particular school, have been regarded as contributing to the kind of teamwork I have sought to describe.

First, it is a definite policy of our school to recognize the importance of individual obligations or commitments arising outside the school and, in so far as possible, to provide the individual with time to meet these obligations. Instances of such need are to be found in a host of areas—obligations in Boy Scouts, Girl Scouts, churches, at home, and to community organizations, and opportunities to keep appointments with the doctor, the orthodontist, private music teachers, private art teachers, private dancing teachers, and others. This policy is based soundly on the belief that the individual's education is derived from his total experience, and that the school holds no monopoly on the sources or the inspiration of his education. Of course, we have our own peculiar and unique responsibilities and, furthermore, the school must operate under such restrictions upon administrative discretion as may be enacted by legal authority, local or state. When one recognizes the very considerable latitude within which schools are permitted to exercise discretion, however, the opportunities for its exercise become more apparent.

Second, our school encourages students and parents to look ahead and anticipate the needs which are likely to arise during the year, or which may be known to exist. Here, a specific technique is used. At a three-cornered conference, involving the dean or guidance counselor, the child, and the parents, held in the spring with all students and parents, every effort is made to work out together the total program of the student for the ensuing year. Such matters as courses of study, school activities, outside activities, future plans, present progress—these and many other matters are considered individually in conferences averaging three quarters of an hour or more in length. Careful note is made at that time of the anticipated or known commitments arising outside the school and, in such cases as seem to require it, note also is made of suggested or requested adjustment of time schedule to meet individual needs. Such conferences afford opportunity for the school to explain its policy and, in numerous instances, offer suggestions as to how the individual needs may be met without undue interference with the regular school program. We have many notes, for instance, concerning orthodontic treatment and, in such cases, we urge parents to let us know the time of day and day of the week when treatment can be arranged most conveniently for the family and the orthodontist. Let me hasten to add, too, that this procedure applies not only to orthodontic treatments but to many other kinds of individual needs.

Third, the school makes conscious effort to arrange a master schedule of classes and activities that will maintain as great a degree of flexibility as possible, in other words, one that will contain within its total structure a maximum number of equally good and possible arrangements of individual programs. To be precise, if there are to be six sections of second-year French to be scheduled, the school distributes these sections in as many different periods of the day. This principle of flexibility is consciously emphasized for the specific purpose of accommodating to the maximum possible degree the individual's varying needs. It must be recognized, of course, that there are

limits beyond which flexibility ceases to be an instrument of policy and becomes mere confusion. In dealing with the tremendously complex problems of scheduling, no solution can be had if all the factors involved in the problem remain variables. As an exercise in problem solving, one after another of the variables must be reduced to constants and, when once determined, the process of solution takes its course. Here, again, it may be well to point out that the solution which is sought is not that which is either the quickest or the easiest but, rather, that which is best in terms of the function to be performed.

Fourth, when armed with the necessary information concerning individual needs, and provided with an organizational tool specially designed to meet these needs, the school works out each pupil's program as an individual problem. There is no group or block programming. Each pupil is regarded as a distinct entity, and the effort is not to achieve *uniformity or identity of program but equality of program.* Equality of program must be based on the individual's needs rather than on the mean of the group as a whole. Of course, this is an arduous and, sometimes, tedious task, but the process is consistent with the basic philosophy and policy of the school.

Fifth, every effort is made to schedule pupils with outside commitments which justify use of school time, in such a way as will not mean loss of actual instruction. Specifically, with reference to pupils with orthodontic appointments to be met, there are three generally favored times of the school day for such arrangements: in the early morning period or periods when the child may go to the orthodontist *before* reporting to school and at a time when family transportation most often can be conveniently arranged; at the midday point when a period may be arranged either immediately before or immediately following the normal luncheon period; during the last period or periods of the day. Skillful working out of schedules for individuals generally can make some such arrangement possible, and the school considers such needs as a part of the total school organization problem. When this can be done (it is not always possible to do it, of course), there is then no conflict between the school and the private practitioner. We recognize, of course, that one of the practical problems of the orthodontist is to get his patients, most of whom are children, distributed through the day and week, so that he is not deluged in late afternoon hours, Saturdays, and school holidays. Furthermore, since the nature of the orthodontic treatment requires regular and repetitive appointments, usually running over considerable periods of time, this need is the greater. It has seemed to us that any possible arrangement, therefore, which permits such a distribution for the orthodontist, makes a direct contribution to his total effectiveness, the quality of his professional services and, as I have been led to believe, to the financial cost to the patient.

In concluding these remarks, it is incumbent upon me to note that the procedures outlined above, as being employed by one school, must not be regarded as necessarily equally applicable to any other specific school. Nor, indeed, should I be understood as indicating that these procedures are unique; indeed, I am reasonably certain they are not. If I may use the cliché, "Where

there is a will, there is a way." Teamwork is more a matter of the spirit, more a matter of attitude, than of process or procedure. It begins with mutual understanding and respect; it requires identification of mutual interests and purposes; it prospers only when all parties recognize the reciprocal character of it; it justifies its demands on time and energy by the results it achieves. Schools are complex institutions today. If we would avoid making them still more complex, we must be wary of thrusting upon them the responsibilities for an ever-widening circle of obligation. If the tendency toward centralization of responsibility which some of us, at least, believe to be undesirable, is to be brought under control, teamwork of the kind I have attempted to describe can make a powerful contribution to that end. One could build a strong case for such teamwork, then, not only as a practical and effective way of going about things but, also, as a way of perpetuating and strengthening the fundamental social, political, and economic concepts that have made our nation great.

SCARSDALE HIGH SCHOOL.

Erratum

In the article by Edward A. Lusterman entitled "Class II, Division 1 Malocclusion" which appeared on page 505 in the July issue of the JOURNAL, *A* and *B* of Fig. 4 were transposed. The profilograph should have been labeled *A*, and the cephalometric roentgenograph tracing should have been labeled *B*.

CLASS II, DIVISION 1 (ANGLE) MALOCCLUSION

Report of a Case

Theodore L. Jerrold, D.D.S., Brooklyn, N. Y.

1. *Title.*—Case 1316. The patient was a white girl, aged 11 years, 3 months.

2. *Diagnosis.*—She presented a Class II, Division 1 (Angle) malocclusion but, because both buccal segments in the mandibular arch had drifted forward, the canines having by-passed the lateral incisors, the case gave the appearance of a Class I (Angle) malocclusion. The maxillary arch was in protraction. The deciduous canines were present bilaterally, and the right second permanent molar was just erupting. The second permanent molar on the left side had not erupted as yet. All the other permanent teeth were present in this arch, with the exception of the third molars, bilaterally. Both the right and left permanent first molars were slightly rotated, and the right permanent first molar was also in mild linguoversion.

In the mandibular arch, there was crowding in the anterior segment and both buccal segments had drifted forward with the resulting loss of arch integrity at the lateral incisor-canine area. All the permanent teeth were present in this arch, with the exception of the permanent second and third molars. (Fig. 1.)

Intra- and extraoral roentgenographic examination revealed the presence, in the maxillary arch, of the permanent canines on both the right and left sides, the permanent second molar on the left side, and the third molars bilaterally. In the mandibular arch, the permanent second and third molars also were present on both the right and left sides.

3. *History and General Clinical Picture.*—The patient was American born of American parents. She was a breast-fed baby, who sat alone at the age of 7 months, walked at the age of 11 months, and talked at the age of 18 months. At the time of this examination, she seemed to be in good physical health, well developed, had fair posture, and was of average intelligence. Her tonsils and adenoids were removed at 8 years of age and she had had the usual childhood diseases, consisting of chicken pox, mumps, and measles. A medical history supplied by her physician at my request revealed a digestive disturbance at 3½ years of age, which was thought to be yellow jaundice, but did not develop into anything. Her physician also informed me that there was no allergic condition, endocrine disturbances, or hereditary manifestations present. Her oral hygiene was good and she had very few dental restorations. Tissue tone was fair and her tongue and oral mucosa were normal. The patient, however, was a thumb-sucker until 6 years of age.

This case report was submitted to the American Board of Orthodontics in partial fulfillment of the author's requirements for certification.

4. *Etiology.*—The fact that the patient was a thumb-sucker until 6 years of age was undoubtedly the cause of the maxillary protraction. The premature loss of the mandibular deciduous lateral incisors, on both the right and left sides, was the probable cause of the bilateral drifting of the mandibular buccal segments and the ensuing by-passing of the permanent lateral incisors by the canine teeth.

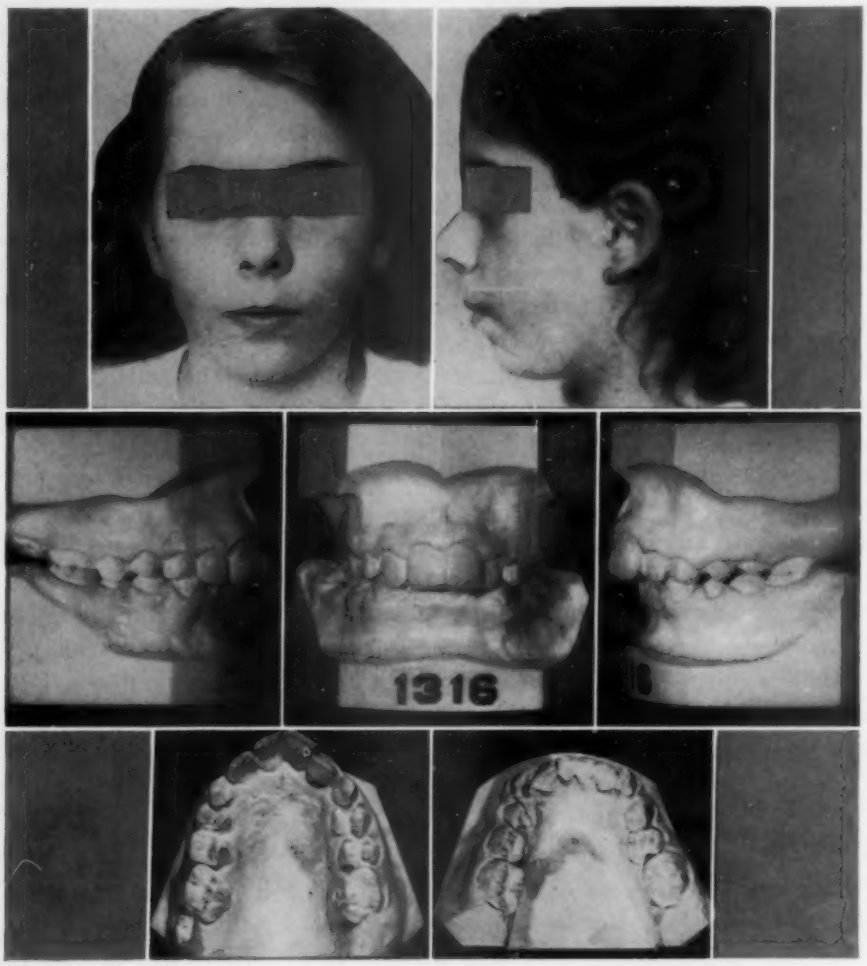

Fig. 1.—Photographs and casts taken at the beginning of treatment.

5. *Plan of Treatment.*—

A. *General plan:* It was felt that in order to reduce the maxillary protraction and the crowding of the mandibular anterior teeth, it would be necessary to remove dental units in these arches, correct all localized dental anomalies and the exaggerated curve of Spee, and re-establish the integrity of both dental arches.

B. *Appliances used:* A combination of both a Mershon lingual and the edgewise appliance was used in this case. Precious metal bands with vertical half-round tubes, for the reception of a Mershon lingual appliance, and buccal

tubes, 0.023 by 0.029 inch, for the reception of labial arch wires, were fitted and cemented on the permanent maxillary right and left first molars. In April, 1947, a Mershon lingual appliance of precious metal was fabricated and inserted into the half-round lingual tubes on the maxillary first molar bands. The object of this appliance was threefold: (a) to correct the linguoversion of the permanent maxillary right first molar, (b) to correct the rotations of both the maxillary right and left permanent first molars, and (c) to maintain arch length until the permanent canine teeth could erupt into their normal position after the extraction of the deciduous canine teeth and first premolars bilaterally. After the permanent canine teeth had erupted into position and the linguoversion of the maxillary right permanent first molar and rotations of the maxillary permanent right and left first molars had been accomplished, nonprecious metal bands were fitted and cemented on the maxillary right and left canines and second premolars and on the mandibular right and left canines, second premolars, and permanent first molars. The mandibular right and left permanent first molar bands carried rectangular buccal tubes, 0.023 by 0.029 inch, for the reception of the labial arch wires. The mandibular right and left first premolars then were extracted and sectional arches of 0.021 by 0.025 inch stainless steel rectangular wire were fabricated and ligated into the buccal segments from the permanent first molars to the canines, in both the maxillary and mandibular arches on the right and left sides. These arches had vertical closed spring loops incorporated in them in the region between the permanent canine teeth and the second premolars. Stops were placed about one-eighth of an inch mesial to the buccal molar tubes, so that the vertical spring loops could be activated about the thickness of a dime every three weeks. After the maxillary and mandibular canine teeth, on the right and left sides, were brought back into contact with the second premolars, nonprecious metal bands then were fitted and cemented on the maxillary and mandibular anterior teeth and the maxillary Mershon lingual appliance was removed. The sectional arches were replaced, in both maxilla and mandible, by full arches of 0.018 inch round stainless steel arch wires, with stops against the buccal tubes, in order to level off the teeth. These arches were replaced, after six weeks, by 0.022 inch round stainless steel wire, with stops against the buccal molar tubes, in order to get good bracket engagement.

The spaces between the maxillary and mandibular anterior teeth were closed and the teeth brought lingual by replacing the 0.022 inch round stainless steel arch wires with 0.021 by 0.025 inch rectangular stainless steel arch wires, which had incorporated in them vertical closed spring loops between the permanent canines and second premolars, bearing in mind that the anterior segments of these arch wires were rounded off from the distal of the canine bracket, on the one side, to the distal of the canine bracket on the other side. They also had incorporated in them distal tip back bends in the buccal segments, with stops placed about one-eighth of an inch mesial to the buccal molar tubes, enabling the vertical spring loops to be activated about the thickness of a dime, every three weeks, until all the spaces had been closed in the maxillary and mandibular arches.

After the spaces had been closed in both arches, a mandibular 0.021 by 0.025 inch rectangular stainless steel arch wire, which had distal tip back bends in the buccal segments and coordinated mass lingual torque in the anterior

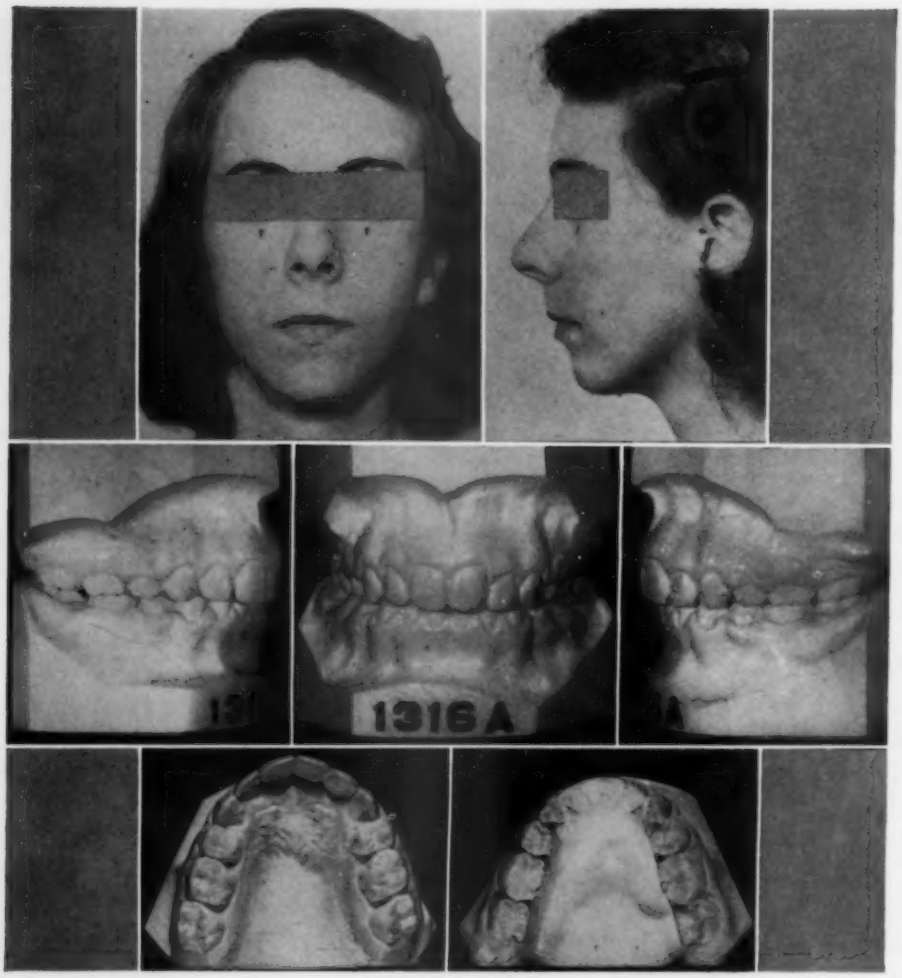

Fig. 2.—Photographs and casts taken at the conclusion of secondary treatment.

segment, stops against the buccal molar tubes, and intermaxillary hooks soldered in the area between the permanent canine and lateral incisor teeth, for the reception of Class III intermaxillary elastics, was constructed and ligated into position. In the maxillary arch, an 0.022 by 0.028 inch rectangular stainless steel arch wire, which had incorporated in it distal tip back bends in the buccal segments and coordinated mass lingual torque in the anterior segment, stops against the buccal molar tubes and hooks soldered in the area between the permanent canine and lateral incisor teeth, for the reception of occipital anchorage, in order to minimize the forward movement of the maxillary arch during Class III mechanics, was constructed and ligated into position. Number 3,

Class III intermaxillary elastics then were applied and the necessary adjustments were made on these arches until anchorage had been established in the mandibular arch.

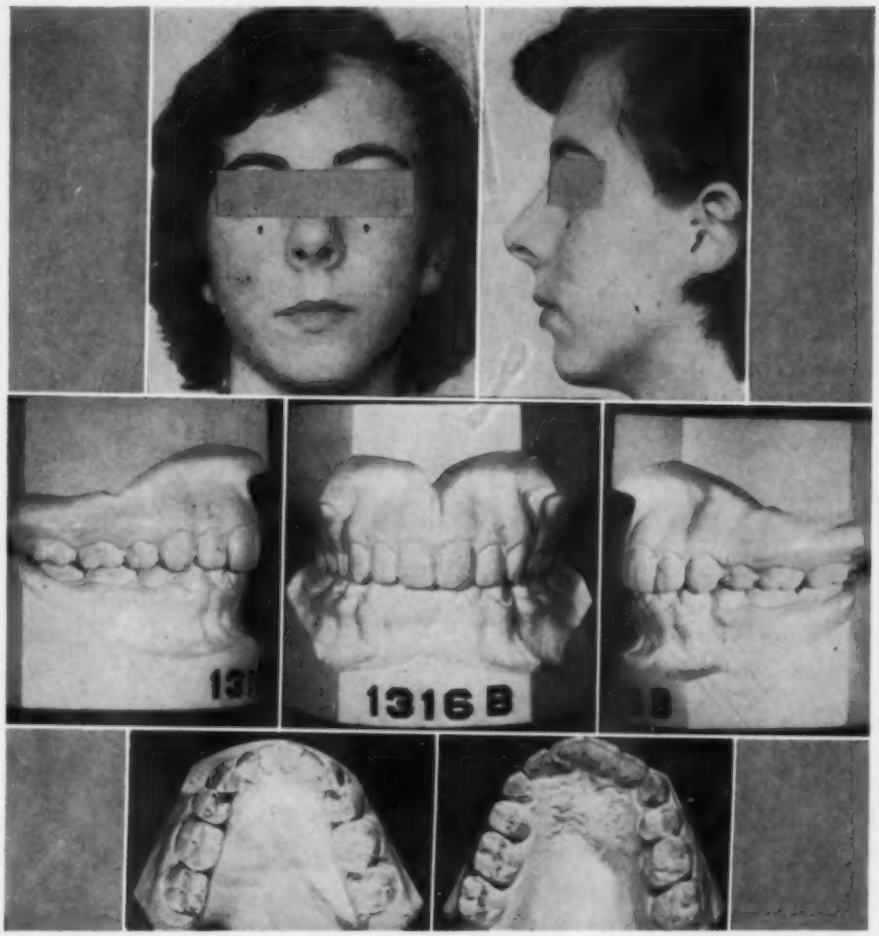

Fig. 3.—Photographs and casts taken twenty-three months after the conclusion of secondary treatment. Note the considerable facial improvement since the conclusion of active treatment.

These arches then were replaced in the maxillary arch, with 0.021 by 0.025 inch rectangular stainless steel arch wire, with distal tip back bends in the buccal segments and coordinated mass lingual torque in the anterior segment, incorporated in it, with stops against the buccal molar tubes and hooks in the area between the permanent canine and lateral incisor teeth for the Class II mechanics; in the mandibular arch, with an 0.022 by 0.028 inch rectangular stainless steel arch wire, which had incorporated in it distal tip back bends in the buccal segments and coordinated mass lingual torque in the anterior segment, with stops against the buccal molar tubes. Number 2, Class II intermaxillary elastics then were employed and the necessary adjustments made, in

order to establish normal jaw relationship by bringing the mandible forward. The appliances were removed in August, 1949. The period of active treatment was 27 months.

C. *Supplemental therapy:* None.

6. *Progress of the Case.*—After the placement of the appliances, the patient was seen every three weeks for necessary adjustments. Cooperation and response on the part of the patient were good, and the length of time to establish anatomic and functional relationship was twenty-nine months.

7. *Secondary Treatment.*—After appliances were removed a positioner was inserted and worn for two months and then discarded. No other retainers were used.

8. *Results Achieved.*—The maxillary protraction was greatly reduced and the linguoversion and rotation of the maxillary right first permanent molar was corrected, as was the rotation of the first permanent molar on the left side. The maxillary right and left second permanent molars erupted into their normal position in the arch. The mandibular retraction, as well as the slight protraction and crowding of the mandibular anterior teeth, was corrected, and a good alignment and arch form were obtained, along with a reduction of the exaggerated curve of Spee to a more normal plane. The mandibular right and left second permanent molars had erupted into their normal position in the arch. There was considerable improvement facially, dentally, and functionally for this patient. Intra- and extraoral roentgenographic examination revealed no unusual changes of a pathologic nature, and the mandibular and maxillary third molars continued their normal development and eruption on both the right and left sides.

9. *Observations and Conclusions.*—The final results obtained in this case were very gratifying to the patient, as well as myself. I believe that I was correct in both my diagnosis and treatment plan for this patient, which can be seen by reviewing the casts, photographs, and roentgenograms at the conclusion of secondary treatment (Fig. 2).

10. *Posttreatment Findings.*—Final photographs and impressions were taken twenty-three months after the conclusion of secondary treatment. The mandibular right lateral incisor was just the least bit lingual; otherwise the function and position of the teeth were excellent. It must be noted that there is a considerably further facial improvement since the conclusion of secondary treatment (Fig. 3).

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A METHOD FOR ASSESSING THE PROPORTIONAL RELATION OF APICAL BASES AND CONTACT DIAMETERS OF THE TEETH

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INTRODUCTION

THE relation of maxillary apical bases and tooth crowns to their mandibular opponents, and the relation of the base of each arch to its respective tooth crowns, is one of the most important criteria in orthodontic diagnosis and treatment planning. That there must be a harmonious relation of these factors to have esthetics and stability is generally accepted. This is true of the ideal occlusion and it is the goal we seek in orthodontic treatment.

This study describes a method for measuring the apical base easily, quickly, and accurately enough for statistical purposes. A method of determining apical base has been the principal difficulty in attempts to establish the above-mentioned relations. The mesiodistal diameters of the teeth at their anatomic contact points comprise the plane of the tooth crowns with which we are concerned. It will be referred to hereafter, for brevity, as contact diameter.

The measurements of apical bases and contact diameters on a series of normal occlusions have been recorded to determine what their relation is. From this data, a formula has been prepared to enable a ready analysis to be made of the apical bases and contact diameters present in any case, and the amount of deviation, if any, from the normal range that must be evaluated in treatment planning.

A study has been made of the results of orthodontic treatment on a variety of malocclusions with the proportional relation of (1) maxillary apical base to contact diameters or maxillary teeth, (2) mandibular apical base to contact diameters of mandibular teeth, (3) maxillary to mandibular apical base, and (4) contact diameters of maxillary to mandibular teeth.

REVIEW OF THE LITERATURE

Weinberger[1] has stated that among early authors expressing an opinion on the etiology of malocclusion, Maury (1834), Jobson (1834), Imrie (1834), Saunders (1844), and Tomes (1847) believed the jaws were too narrow to allow proper positioning of the teeth. Lefoulon (1841) believed the alveolar arch could be expanded. Talma (1840) wrote that narrowness could be neutralized by natural growth. Kingsley (1865) regarded extraction necessary in certain types of malocclusions. The observations of these men cannot be valued as more

This thesis, which was given as a partial fulfillment of the requirements for certification by the American Board of Orthodontics, is being published with the consent and the recommendation of the Board, but it should be understood it does not necessarily represent nor express the opinion of the Board.

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than personal opinions dictated by conditions which they had observed in their practices. From Fauchard's writings we know some mechanical devices were being used before his time to align teeth. However, no appliance had been designed to accomplish the apical expansion of arches. Therefore, no opinion could be the result of clinical experimentation, nor are there any records as to the types of malocclusion upon which their opinions were based.

The modern orthodontic era began with Angle,[2] who propounded the theory of normal occlusion as the aim of all orthodontic treatment and developed appliances capable of placing the crowns of the teeth in normal functional relationship. The first appliances accomplished this by a tipping of the crowns. The failure of too great a percentage of these cases to remain stable drew the attention of Angle[3, 4] to the axial inclination of teeth and the apical base. His later appliances, the pin and tube, the ribbon arch, and the edgewise arch, were designed to accomplish an apical movement to coincide with the corrected position of the crowns of the teeth. The basis of this theory was that the dental arch determines the size of its base, if it is in proper occlusion and function. This concept dominated orthodontics until about 1935. Then, when appliances had reached near perfection in attaining the operator's objective, and the percentages of relapses still remained high after completion of treatment, there began a reappraisement of the working hypothesis of orthodontics based on a scientific study of the natural laws of growth and development. Some opposition to the occlusionist trend is recorded in the works of Case,[5] who wrote, "It is contrary to the laws of biology that environing forces, or any kind of artificial stimulation has the power to cause bones to grow interstitially larger than their normal inherent size." Wallace[6] advanced a theory of forward translation of teeth, and expressed doubt of the stability of expansions unless tongue size would compensate to balance the internal and external muscular forces. Lundström[7] presented a very comprehensive paper in 1923, entitled "Malocclusion of the Teeth Regarded as a Problem in Connection With the Apical Base." He concluded that growth of the apical base is spontaneous and is not stimulated by orthodontic treatment or masticatory function, that prognosis for successful treatment depends upon the normality of the apical base, and that the occlusion cannot control the apical base, although the base is highly capable of affecting the occlusion. Lundström's conclusions have been verified in most details by later cephalometric studies. Others who expressed some doubt, after examining their results, were Bennett,[8] Cryer,[9] Young,[10] Federspiel,[11] Lourie,[12] Grieves,[13] Kemple,[14] Pullen,[15] Weinberger,[16] Johnson,[17] and Mershon.[18]

The development of the cephalometric x-ray, as an adjunct of orthodontics by Broadbent,[19] together with a study of the growth and development of the normal child, has given us a scientific means of treatment appraisal. Brodie,[20] Downs,[21] and Goldstein and Meyer[22] have stated in their conclusions of cephalometric appraisal of orthodontic management that actual bone change seems to be restricted to the alveolar process. Tweed,[23] as a result of clinical observation and treatment of a series of cases, developed the hypothesis that the key to normal denture position was the placing of mandibular incisors upright over

basal bone. Grieve[24] had expressed similar views earlier, particularly that most malocclusions are due to forward translation of the teeth. Brodie,[26] in discussing extraction of dental units in orthodontic treatment, summarized, "It is our opinion that the extraction problem reduces itself to a consideration of just one question viz., is there enough bone to hold the teeth in a normal stable position following treatment? At present we have no accurate means of determining the relation between the mass of tooth crowns and supporting base."

Several methods of determining the relation of basal bone to tooth crowns have been published since 1947. Nance[26] in his article, "Limitations of Orthodontic Treatment," presented a method of determining arch length in the mixed dentition on the mandibular arch, from the mesial of the first molar to the mesial of the opposite first molar. The most significant points of his work are: (1) arch length is always shortened in transition and cannot be permanently increased in the mixed dentition; (2) if a permanent stable result is to be attained, mandibular teeth must be properly positioned in relation to basal bone; and (3) arch length may be increased only to a limited extent where either lingually inclined teeth are uprighted or molars are moved distally when there has been a mesial drift.

Nance's method uses a 0.012 inch brass wire contoured on the model to the visualized ideal shape of the arch through the contact points from the mesial of the lower first molar to the opposite lower first molar, to determine the apical base, with a standard 3.4 mm subtraction for the forward drift in transition to the permanent dentition, except where this drift has occurred prior to the transition. The tooth mass is determined by measuring the erupted teeth on the model and the unerupted teeth from intraoral x-rays with dividers. Nance has given us a scientific means of prognosis in mixed dentition diagnosis. There are some places where the accuracy may vary:

1. In determining arch length in the previously described manner, the visualized form will vary with the individual who is contouring the wire. This may be slight, but it will not produce an exact figure in the hands of different operators.

2. The average 3.4 mm. mesial molar drift in individual cases has extremes of from 0 to 8.9 mm., which is not accurate enough in borderline cases.

3. The average error in the most accurate of intraoral x-rays of unerupted teeth is 10 per cent (Ballard and Wylie[29]), too large to be diagnostic in borderline cases.

4. No consideration is given to the maxillary apical base.

Howes[27] deals with the maxillary arch alone. He has found that the width of the upper six incisors and the width of the arch in the first premolar area show a variation of only 3.5 per cent in normal stable nonextraction cases. Where the base is insufficient, the premolars and anterior teeth are displaced mesially, or crowded, reducing the first premolar width in relation to the incisor width. His premise for considering the maxillary arch alone is that, being fixed to the skull and lateral to the mandibular arch, it governs mandib-

ular development. This study contains much valuable information. The following points are not clearly defined, however: (1) the relation of maxillary to mandibular base, which may vary widely; (2) discrepancies in base, manifesting themselves in blocking or impaction of teeth distal to the first premolar; (3) the variation in width and tooth material is 7 per cent, too great for accurate prognosis in borderline cases.

Carey[28] has published a method of analysis that estimates the size of unerupted lower cuspids and premolars according to a method first published by Ballard and Wylie[29] which uses the correlation in size of the mesiodistal diameter of the four lower incisors with that of the unerupted lower cuspids and premolars. This is more accurate than intraoral x-rays. The variation in twenty cases averaged 0.93 mm., the largest variation, 2.6 mm. To determine the apical base, Carey used a contoured wire as previously suggested by Nance. He has further presented a mathematical formula to determine when extraction of teeth is necessary for stability, and which units it is most desirable to remove. Carey advises extraction where discrepancy of more than 2.5 mm. exists. When the discrepancy is not more than 5 mm., second premolars are removed. When it exceeds 5 mm. first premolars are removed. This formula is applied to either dental arch and is an excellent key for discrimination in the extraction of teeth. In twenty cases, Dr. Carey has tabulated measurements of the mandibular arch in the mixed dentition, the permanent dentition of the same case, and whether it is an extraction or nonextraction problem. Seven of these cases are borderline, or have lineal arch deficiencies of less than 2.5 mm. in the permanent dentition, according to Dr. Carey's measurements. Of the seven, four have been treated as an extraction problem and three as nonextraction cases. This procedure of assessing arch length does not appear to be clear-cut in borderline cases. Although Carey mentions the discrepancy in apical base between maxillary and mandibular arches, no means of determining maxillary length is discussed.

Kesling[30] has advocated as a diagnostic aid a procedure in which duplicate models are made, and the teeth cut off and reset in ideal occlusion. If there is insufficient base to accomplish this, tooth units are removed from the setup and extraction of these units is followed in the treatment of the case. This is probably the best means of case analysis yet devised. There are, however, these shortcomings: (1) a substantial amount of time is necessary to make the setup; (2) the teeth are not removed to a point that will correspond to the apical base in all cases; (3) the setup and arch form will vary with the ideals of the individual doing it; (4) it is applied to the permanent dentition only.

ANATOMY AND HISTOLOGY

The area of the maxilla and mandible that supports the alveolar process has been given various names in the literature; foundation base, main body of the bone, apical base, and basal bone are synonymous terms. The term "apical base" as designated by Lundström seems to me the most descriptive of the area with which we are dealing. The area of the maxilla and mandible that we have

designated as apical base is that portion which supports the alveolar process. Lingually and buccolabially, it is bounded by the two cortical plates. Vertically it lies on a plane through the apices of the roots of the teeth (Fig. 1). Histologically, alveolar and basal bone cannot be differentiated (Noyes, Schour, and Noyes[31]). Functionally, alveolar bone responds to both physiologic and mechanical movement of the teeth, is molded in response to functional demands of the teeth, and disappears when they are lost. The maxillary alveolar bone is almost a fusion of the outer cortical plate and the labial and buccal aspects of the roost of the incisors, cuspids, premolars, and first molars. In the mandible the labial surface of the incisor roots is in close proximity to the outer plate.

Fig. 1.—Skull showing area of apical base.

The premolars, cuspids, and first molars have a lingual axial inclination as they approach the apex. The premolar and first molar roots on their buccal surface have only thin layers of cortical bone. The second and third molars present a distinctly heavier plate on their buccal aspects. The mucous membrane covering the alveolar process is divided into two distinct areas. The alveolar mucosa, dark red, mobile, and of very thin texture, covers the apical base. The gingiva, light, immobile, and thicker, covers the necks of the teeth. A definite line of demarcation can be observed between the two areas (Sicher[32]). Separating the apical base of the teeth, except second and third molars, from the vestibule, we have only a very thin layer of cortical bone and alveolar mucosa.

Growth of the apical base of both jaws subsequent to the eruption of the first permanent molar is confined to the distal portions to be occupied by the second and third molars. Vertical height increases in the alveolar process until full eruption of the teeth. Apical base from first molar to first molar does not

appear to change subsequent to the eruption of these teeth, except to decrease the equivalent of the amount of forward migration during transition from mixed to permanent dentition (Nance[26]).

METHOD

All measurements are made on orthodontic casts for this study. It is essential that the casts are as accurate as possible, special attention being given to extension into the mucobuccal fold in order to approximate basal bone to at

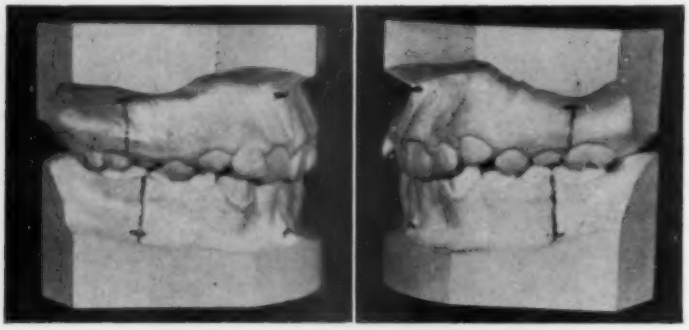

Fig. 2.—Lines marked on cast for measurement of apical base.

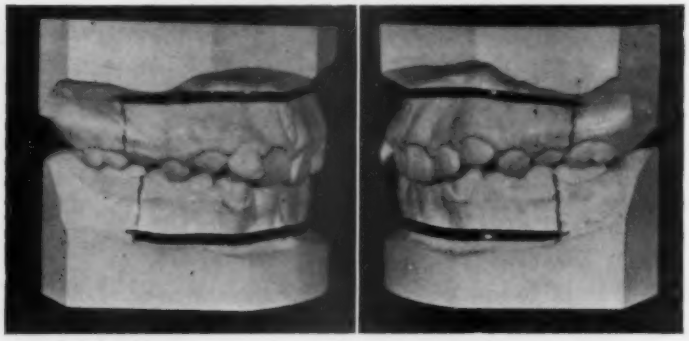

Fig. 3.—Scotch tape placed on apical marks.

least the distal of the first permanent molar. The technique devised by Lang and portrayed in his moving picture is used in our office. To insure a good roll, the periphery of the impression tray is built up with pure beeswax so that it will carry the impression material to the desired height. The models are trimmed with the bases parallel to the occlusal plane, so that as each cast is placed on its base for measurement, occlusal surfaces of the teeth are still parallel to the occlusal plane. All muscle attachments and the frenum are trimmed flush with the basal area of the models to prevent the inclusion of any superfluous soft tissue mass in the measurement.

A ruler is placed against the side of the cast, at right angles to the occlusal surface, and a line is drawn at the mesial contact point of each first permanent molar and a third line through the midline contact of upper or lower central

incisors. This line is extended to a point 8 to 10 mm. from the gingival margin in an apical direction, and a cross is made at this point. The line is best made with a knife or sharp pencil (Fig. 2). A piece of Scotch tape 5 inches long is cut into strips approximately 1/8 inch wide, with scissors or by placing the tape on a piece of wood and using a razor blade or sharp knife edge with a ruler as a guide. A thin strip of tape then is placed so that one end is superimposed upon a molar mark, the tape pressed firmly to the cast to pass through the incisor point, and then through the opposite molar point (Fig. 3). It is cut with a sharp instrument at the latter molar point, removed from the cast, and placed along a line on a ruled card. The teeth on each cast from second premolar to second premolar are recorded at their greatest mesiodistal diameter with small dividers and the distance is marked on a line of the same card. The length of apical base as represented by the tape and total mesiodistal diameters of the teeth can be measured easily with the millimeter ruler for comparison (Fig. 4).

Fig. 4.—Measurements of contact diameters of the teeth and arch length, placed on card for comparison.

The exact amount of alveolar process resorbed with the loss of the teeth is not known, and as the apices of the roots are inclined away from the outer cortical plate, a point 10 mm. apically from the gingival margin can be used as reasonably accurate for all three points. Black has given an average of 12 mm. for the upper incisor roots, 11.8 mm. for lower incisor roots, and 13.2 mm. for the longest of the molar roots. These measurements appear consistent with the use of a point 8 to 10 mm. from the gingival margin as the apical area. If accurate x-rays are available, the distance from the gingival margin to the apex of the roots can be checked for any exceptional deviation from the average root length, and allowances made for such deviation. Consideration must be given and allowance made for first molars that are tipped mesially or rotated, as uprighting or rotating these molars will increase the base by the amount of the deviation.

The buccal mucosa is included in the measurement, but, as it is very thin in this area, the deviation is relatively small and is relatively consistent for all cases. Only base anterior to the first molar has been used, as the first molar is the guide to the position of the rest of the teeth (Angle[2]). Practically all orthodontic effort is concentrated in this area. Arch length distal to the first molar when it is in normal axial inclination is only of academic interest (Nance[26]). The buccal roots of the second and third molars, varying in depth

from the buccal plate, would not be accurate for measurement. Cross-bites or constrictions due to abnormal lingual inclination need not be considered, as they do not affect the apical base or the tooth size.

Changes in the ratio of apical base to tooth mass may be made during orthodontic treatment in only two ways: (1) the base may be increased by a distal movement of the first molars or decreased by a mesial movement of the first molars and (2) the tooth mass may be reduced by the removal of dental units. Using the method just described, a series of twenty casts of normal nonextracted cases in which the teeth appear in good relationship to basal bone, and no rotations, crowding, or spacing are present, were recorded to ascertain if there is any constancy in ratio of base and teeth in normal occlusions. Table I is a tabulation of the measurement of teeth and apical base on these models, showing a high degree of correlation in each arch and between the maxillary and mandibular arches.

TABLE I

CASE NUMBER	MANDIBULAR BASE LB	MANDIBULAR TEETH LT	MAXILLARY BASE UB	MAXILLARY TEETH UT
1	70	65	77	72
2	75	68	80	76
3	77	73	83	79
4	76	70	79	75
5	72	66	77	74
6	73	68	78	76
7	73.5	70.5	79.5	78
8	68.5	64	77	73.5
9	70.5	68	80	76
10	69	65.5	77	74
11	70.5	66	76	73.5
12	71	67	77	73
13	77.5	72	82	80
14	74	69.5	80	76.5
15	71	66.5	78.5	75
16	70	64	74	70
17	69	64	76	74
18	67.5	64.5	75	72.5
19	68	65	77	73
20	70	67	76.5	74
Average	71.65	67.2	77.9	74.8

It is hoped that a larger series of ideal occlusions may be analyzed at a later date as a check on the validity of this rather limited number of cases. The average deviation of this group has been carried to two standard deviations to include approximately 95 per cent of all normal occlusions.

Measurements of relations of teeth to base in normal untreated occlusions show that: (1) upper apical base exceeds tooth mass by 3.2 mm., minimum 1.39, maximum 5.15, range 3.76; (2) lower apical base exceeds lower teeth by 4.47 mm., minimum 1.97, maximum 6.97, range 5.0; (3) the upper base exceeds the lower base by 6.34 mm., minimum 3.12, maximum 9.56, range 6.44; (4) upper teeth exceed lower teeth by 7.57 mm., minimum 5.17, maximum 9.97, range 4.8.

The following chart will permit a quick analysis on any set of casts. U represents maxillary, L represents mandibular, B represents apical base, T

represents tooth crowns. Comparisons are arranged so that the first quantity is in excess of the second by the amount of the measurement. Quantities are reduced to the nearest 0.5 mm.

UB to UT plus 1.5 to 5.0 —mean 3.5—range 3.5 mm.
LB to LT plus 2.0 to 7.0 —mean 4.5—range 5.0 mm.
UB to LB plus 3.0 to 9.5 —mean 6.5—range 6.5 mm.
UT to LT plus 5.0 to 10.0—mean 7.5—range 5.0 mm.

To use this chart in mixed dentition cases, the average sizes of unerupted premolars and cuspids may be substituted for the deciduous teeth, and the 3.4 mm. allowance for forward drift in transition should be subtracted from the arch length, where it has not occurred already.

By comparing the preceding table of average normals to the measurements taken on any set of casts, we are able to determine with reasonable accuracy the following points of diagnostic significance:

1. The relation of the apical base to the teeth of each arch. If a discrepancy exists, the amount is important; in cases that are borderline, internal and external muscular forces, facial esthetics, and other factors will determine our treatment plan.

2. The relation of maxillary to mandibular base. Where a discrepancy exists between the opposing arches, reduction of teeth and base may be necessary in one arch, or if this is not indicated, an expansion of the other arch is the only other alternative. Prognosis can be determined by the amount of discrepancy existing.

3. The relation of tooth size in maxillary to mandibular arches. Where discrepanciees beyond normal range are present, we are faced with spacing or crowding in our finished case, unless the tooth mass is equalized by reducing it in one arch, or increasing it by the judicious placing of crowns or inlays on the teeth of the other arch. The amount of disharmony should be known to devise the best plan of procedure.

Application of Measurements.—Measurements were taken of a series of malocclusions treated by me to compare their diagnostic significance with the known results. As varying types of cases as possible were chosen.

Case 1. Class I, nonextraction:

Before treatment:
LB 68.0. LT 70.5. UB 78.0. UT 78.5.
UB to UT minus 0.5 mm. 2.0 mm. less than minimum.
LB to LT minus 2.5 mm. 5.0 mm. less than minimum.
UB to LB plus 10.0 mm. 0.5 mm. above maximum.
UT to LT plus 8.0 mm. within average range.
After treatment:
UB to UT unchanged—borderline.
LB to LT increased 3.0 mm., plus 0.5 mm. 2.0 mm. less than minimum, borderline.
UB to LB plus 7.0 mm., within normal range.
UT to LT unchanged, within normal range.

This case presented the appearance of a Class II, Division 2. The lingual inclination of incisors, mesial drift of lower left first molar, and an impaction of the lower left cuspid suggested expansion as the means of treatment. This case is borderline. The only significant change in treatment was an increase of 3 mm. in the lower base due to distal movement of the lower left first molar and bringing the lower left cuspid into the arch. The overbite and esthetics are good, but in time there may be slight crowding and relapse. Extraction would reduce the tooth substance 14 mm. in each arch, leaving 12 mm. of excess space to close with an esthetic result questionable.

Case 2. Class I, double protrusion, four first premolars extracted.
Before treatment:
LB 73. LT 75. UB 75.5. UT 82.5.
UB to UT minus 7.0 mm.—8.5 mm. less than minimum.
LB to LT minus 2 mm.—4.5 mm. less than minimum.
UB to LB plus 2.5 mm.—0.5 mm. less than minimum.
UT to LT plus 7.0 mm.—average range.
After treatment:
LB 64.0. LT 60.0. UB 66.0. UT 67.0.
UB to UT minus 1.0 mm.—2.5 mm. less than minimum.
LB to LT plus 4.0 mm.—average range.
UB to LB plus 2.0 mm.—1 mm. less than minimum.
UT to LT plus 7.0 mm.—average range.

The facial esthetics in this case were very poor and were greatly improved through treatment. There is a discrepancy of upper base to lower base, which existed prior to treatment and is not improved through orthodontic treatment. The relation of the upper teeth to upper base was greatly improved but still is not within normal ranges. Lower base to lower teeth was brought within average range by extraction.

Case 3. Class II, Division 1, nonextraction.
Before treatment:
LB 72.0. LT 71.0. UB 78.0. UT 77.5.
UB to UT plus 0.5 mm.—1 mm. less than minimum.
LB to LT plus 1.0 mm.—1.5 mm. less than minimum.
UB to LB plus 6.0 mm.—within average range.
UT to LT plus 6.5 mm.—within average range.
After treatment:
LB 72.0. LT 71.0. UB 79.0. UT 77.5.
UB to UT plus 1.5 mm.—minimum.
LB to LT plus 1.0 mm.—1.5 less than minimum.
UB to LB plus 7.0 mm.—normal range.
UT to LT—no change—normal range.

Upper base has been increased by 1 mm. by the distal movement of the upper first molars in Class II mechanics. The forward movement of the molars in the lower arch during Class II mechanics was prevented. Most of the correction must have been accomplished in a repositioning of the mandible, as the 1 mm. change in upper molars would not account for the correction of the Class II position of the molars.

Case 4. Class II, Division 1, four premolars extracted.
Before treatment:

LB 62.0. LT 66.5. UB 67.0. UT 76.0.
UB to UT minus 9.0 mm.—10.5 mm. less than minimum.
LB to LT minus 4.5 mm.—7.0 mm. less than minimum.
UB to LB plus 5.0 mm.—average range.
UT to LT plus 9.5 mm.—maximum normal.
After treatment:
LB 56.0. LT 51.5. UB 64.0. UT 62.0.
UB to UT plus 2.0 mm.—average range.
LB to LT plus 4.5 mm.—average range.
UB to LB plus 8 mm.—average range.
UT to LT plus 10.5 mm.—1 mm. above maximum.

This case presented a definite insufficiency of apical base to tooth mass. The extraction of four premolars enabled the amount of tooth substance to be brought within the average range for the available base. The increase in upper base to lower base of 3 mm. during treatment is due to Class II mechanics causing a mesial movement of lower molars and less forward drift to the upper first molars. The tooth pattern before treatment presented a maximum amount of upper tooth material to lower tooth substance. This was increased to 1 mm. above maximum by the extractions of two lower premolars which exceeded the upper two first premolars by 1 mm.

Case 5. Class II, Division 1, two upper first premolars extracted.
Before treatment:
LB 77.0. LT 73.0. UB 77.0. UT 87.0.
UB to UT minus 10 mm.—11.5 mm. less than minimum.
LB to LT plus 4. mm.—average range.
UB to LB—equal.—3 mm. less than minimum.
UT to LT plus 14.0 mm.—4.5 mm. above maximum.
After treatment:
LB 75.0. LT 73.0. UB 73.0. UT 71.0.
UB to UT plus 2.0 mm.—average range.
LB to LT plus 2.5 mm.—average range.
UB to LB minus 2.0 mm.—7.5 mm. less than average, due to Class II relationship of molars in finished case.
UT to LT minus 2.0 mm.—minus 9.5 mm. from average, due to the extraction of two upper first premolars.

This case presented a lower arch with teeth and basal bone in good proportion. The upper teeth were out of proportion to the lower teeth and to the basal bone of the maxillae. The extraction of two upper first premolars brought the upper base and teeth into average range. The lower base was slightly shortened due to Class II mechanics. As a result of leaving the case in a Class II molar relationship, the upper to lower base and upper to lower teeth measurements in the finished case do not apply as in the normal, four premolar, or nonextraction case.

Case 6. Class II, Division 2, nonextraction.
Before treatment:
LB 75.0. LT 69.5. UB 77.0. UT 78.5.
UB to UT minus 1.5 mm.—3 mm. less than minimum.
LB to LT plus 5.5 mm.—within average range.
UB to LB plus 2.0 mm.—1 mm. less than minimum.
UT to LT plus 9.0 mm.—high in average range.

After treatment:
LB 72.0. LT 69.5. UB 79.0. UT 78.5.
UB to UT plus 0.5 mm.—1 mm. less than minimum.
LB to LT plus 2.5 mm.—minimum range.
UB to LB plus 7.0 mm.—within average range.
UT to LT plus 9.0 mm.—unchanged.

In this case the lower arch presented some spacing before treatment. During treatment the lower base was decreased by 3 mm. by closing of spaces and forward movement of the lower first molars in Class II mechanics. The upper base was increased by 2 mm. due to distal movement of the upper first molars in Class II mechanics. The upper teeth are slightly large in proportion to the lower teeth, and are still slightly large in proportion to the upper base after treatment. This case may present some slight relapse, if retention is not planned carefully.

CONCLUSION

The relation of apical base to tooth mass is easily and quickly determined by the method described in this article. It does not require any equipment that is not already available in every orthodontic office. The measurements are consistent if the landmarks are correctly placed, regardless of the individual philosophy of treatment or arch form. No consideration is given the classification of mesial, neutral, or distal occlusion, as a diagnosis and prognosis of these can be obtained better from other diagnostic procedures. The comparative sizes of the teeth of each arch to their apical base, of the apical base of the arch to its opponent, and of the teeth of the arch to the teeth of its opposing arch are of fundamental importance regardless of the intramaxillary relationship of the case.

This analysis will determine accurately whether a malocclusion is an extraction, nonextraction, or borderline problem. When we are confronted with a borderline case, our procedure must take into consideration the factors of muscle force, facial esthetics, Frankfort-mandibular plane angle, axial inclination of molars, and a knowledge of the possibilities and limitations of orthodontic appliances we are employing in the light of our previous clinical experience.

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901 SELLING BLDG.

Editorial

Support of Dental Research

DENTAL caries, a disease which afflicts upward of 90 per cent of the population, is conceded to be the most prevalent affliction of modern man. One would expect that the reduction and elimination of dental and oral disease would be a major concern of those who give financial support to research in health problems. The facts, however, do not bear out these expectations. Dentistry stands nineteenth in a list of twenty-two divisions of medical and allied subjects for which research grants were made during the years 1946 through 1951.

Funds awarded for research in the medical and allied fields during the six-year period from 1946 through 1951 are analyzed in a report of the medical Sciences Information Exchange of the National Research Council.* According to the report, $135,044,125 was awarded through 12,923 grants during the aforementioned period. Of the total amount awarded, 61.5 per cent came from Government and 38.5 per cent came from private sources.

Government support of medical research rose from two million in 1946 to eleven million in 1951. Since Government appropriations for health research increased from 44 per cent to 66 per cent during the same period, it indicates that increased Government support did not affect adversely the flow of private funds for the same purpose.

In the six years mentioned (1946 through 1951), cancer led the group of twenty-two medical and allied subjects in funds received for research with 19.54 per cent of the total funds allotted. Research in dental problems was allotted less than 1 per cent. The exact amount was 0.81 per cent of the total. Dentistry stood nineteenth in the list throughout the entire six-year period. Cancer research received twice as much from private sources as from Government, while dentistry received only one-fifth as much from private sources as it did from Government. In terms of actual funds, dentistry received only a little over a million dollars for research during the entire period. In 1946, dentistry received $48,900 in research grants, of which amount private funds gave almost $30,000. In 1951, when sixteen of the research categories in health received from one to five million dollars, dentistry obtained only $294,226, of which amount private funds contributed only 3 per cent, or less than $8,000.

Although the report concludes that "increasing governmental support of medical research has not diminished funds from private sources," the statement does not hold true for dentistry. Here there was a drop from 60 per cent to 3 per cent in the six-year period.

*Deignan, S. L., and Miller, E.: The Support of Research in Medical and Allied Fields for the Period 1946 through 1951, Science 115: 321-359 (March 28), 1952.

In the report on the financial status and needs of dental schools published by the United States Public Health Service* the information is included that during the fiscal year 1949-1950, dental schools budgeted $733,242 for research, while in the fiscal year 1947-1948, medical schools spent over seventeen million dollars for research. Eight dental schools reported no expenditures for research, while six others spent less than $1,000 each.

The dental profession should give due consideration and then take action to do away with the precarious financial status of dental research. Management of our large industries which did not allocate funds for research would soon find itself displaced by more competent personnel. Dental educators and organized dentistry must face this situation squarely. There are literally thousands of foundations in the United States which have funds that are expended annually by the hundreds of millions of dollars for purposes that are infinitely less important to human health and welfare. It is up to dentistry to make plans to interest these foundations in the support to dental research if it expects to continue to hold its place as a scientific profession.

J. A. Salzmann.

*Financial Status and Needs of Dental Schools, U. S. P. H. S. Pub. No. 200, Superintendent of Documents, Washington, D. C., 1952.

In Memoriam

LELAND E. CARTER*

1882-1953

LELAND E. CARTER of San Carlos, California, died Friday, March 6, 1953 at the age of 71. He was born March 27, 1882 in Newark, California, where he attended the public schools, later graduating from the University of Santa Clara in 1904, then from the College of Dentistry, University of California in 1907. He located in San Francisco and in 1915 he graduated from the Dewey School of Orthodontia in Kansas City, Missouri. He returned to San Francisco where he started the exclusive practice of Orthodontics and had just closed his San Francisco office at 450 Sutter Street to continue the practice of his chosen specialty in San Carlos, where he has made his home for the past few years.

Dr. Carter is survived by his wife and two daughters. His entire life was given to helping others. Wishing to semi-retire, he moved to San Carlos, there to work a little and rest a little, promising himself that he was going to read some of the books he had been promising himself to read when he got the time but in San Carlos he was sought by those who had heard of his kindness, skill and thoughtfulness. Instead of resting, his work became more and more demanding. It is fortunate that he had associated with him Dr. Kenneth Hobson, who will continue Dr. Carter's work in the same careful, kindly way that won him so many friends throughout the years.

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Department of Orthodontic Abstracts and Reviews

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Abstracts Presented Before the Research Section of the American Association of Orthodontists, April, 1952

Rapid Evaluation of Facial Dysplasia in the Vertical Plane: By Wendell L. Wylie, D.D.S., M.S., and Ernest L. Johnson, D.D.S., University of California, College of Dentistry, San Francisco, Calif.

Orthodontists often speak of "good" and "poor" facial patterns, usually without defining the distinction in quantitative terms, although the Frankfort-mandibular plane angle and other angles are coming into increasing use in this connection. Because angles serve poorly to localize and differentiate, this study is directed at showing specifically how certain anatomic areas vary when esthetic distinctions are drawn. Lateral head films taken with the teeth in occlusion provided the basis for this study; 171 of these taken prior to orthodontic treatment in an age group of 11 to 13 years were segregated into fifty-seven good, sixty-one fair, and fifty-three poor, using subjective appraisal only. On each film measurements of facial height at the profile, length of the mandibular body, and the mandibular ramus were made, the gonial angle was measured and the vertical placement of the glenoid fossa of the temporal bone was determined; differences between means were evaluated for statistical significance. The data show that subjective evaluation tends toward "poor" when lower face height becomes large, ramus height becomes short, the angle of the mandible becomes large, and placement of the glenoid fossa of the temporal bone is relatively high. The end product of this study is a set of transparencies for the assessment of vertical dysplasia from lateral films, so that each individual may be placed in relation to the rest of the population (with respect to a given variable) without tracings and without actual measurements being required.

Alterations in the Masticatory Mechanism as a Consequence of Bulbar Poliomyelitis: By S. Pruzansky, D.D.S., M.S., Department of Physical Medicine and Rehabilitation, University of Illinois, Chicago, Ill.

The findings in an 8-year-old boy who suffered an attack of poliomyelitis at the age of 3 were described. In addition to certain muscles of the trunk and anterior flexors of the neck, the masticatory and lingual musculature were affected by the disease process.

As a consequence of bilateral weakness in the masseter and temporal muscles, the boy acquired a compensatory pattern of contraction of his muscles of facial expression to assist in the elevation of the mandible during mastication. Unexplained synkinetic thrusts of the tongue were observed each time the mandible was elevated. The perverse patterns of muscle contraction resulted in a severe open-bite, as well as reduced arch length in the mandible and maxilla. A high palatal vault was observed.

Cephalometric roentgenograms and electromyographic recordings supplemented the presentation. On the basis of the electromyographic studies, a regime of therapeutic exercises was devised in an effort to strengthen the weakened masseter and temporal muscles and to obviate the need for the participation of the facial muscles in mandibular elevation.

Despite the bizarre aspects of this condition, this case was instructive in that it illustrated the role of musculature in the development of occlusion.

Effects of Cheiloplasty on the Maxillary Arch in Newborn Infants With Complete Bilateral Cleft Lip and Cleft Palate: By S. Pruzansky, D.D.S., M.S., Department of Orthodontia and the Cleft Palate Training Center, University of Illinois, Chicago, Ill.

Measurements based on serial casts of the upper jaw and cephalometric roentgenograms in seven newborn infants were presented. In all instances, the first record was obtained prior to cheiloplasty. The age at the time of initial examination varied from 3 weeks to 7 months. Subsequent records were accumulated at three-month intervals during the first year of life and at six-month intervals thereafter. The data presented covered a period of study ranging from three months in one instance to seventeen months in the oldest case.

Variations in the size and position of the premaxilla prior to surgery were noted. In most instances, the premaxilla appeared to be reflected upward and forward with respect to the vomer and maxillary segments. Following lip repair, measurements were made upon the casts to indicate changes in the width of the cleft. In addition, measurements reflecting the growth of the premaxilla and maxilla were presented in tabulated form for each of the seven cases. These measurements revealed progressive reduction in the width of the cleft at all points and continuous growth of the parts contiguous to the cleft.

The cephalometric roentgenograms obtained by means of a specially designed infant cephalometer revealed progressive growth of the middle face in a forward and downward relation to the cranial base. In some instances downward and backward flexion of the premaxilla was observed, in others the premaxilla continued to maintain its previous relation to the vomer. This difference was related to variation in the length of the lip and its molding effect on the premaxilla. The roentgenographic observation of a premaxillary-vomer suture was of special interest in relation to these changes.

Cheiloplasty, whether performed in one or two stages, exerted a molding action on the maxillary arch which served (1) to narrow the cleft and (2) to alter the spatial relations of the bony segments to each other. It was suggested that the degree of undermining necessary to obtain lip closure determined the amount of medial and upward reflection of the palatine processes of the maxilla. The length of the lip, the tightness of the lip, as well as the point of application of the labial forces on the premaxilla are the critical factors in establishing the geometric configuration of the premaxilla. The significance of these findings to orthodontic treatment was indicated.

The Integration of Certain Variants of the Facial Skeleton. A Serial Cephalometric Roentgenographic Analysis of Craniofacial Form and Growth: S. Eugene Coben, D.D.S., University of Illinois, Chicago, Ill.

The morphology and development of varying facial types have been investigated by the analysis of (1) the integration of the skeletal variants resulting in differing facial types, (2) the growth behavior and adjustments of cranial and facial structures within the individual face, and (3) the manner in which such growth may modify facial form.

The study was based upon serial lateral cephalometric roentgenograms of forty-seven individuals including twenty-five males and twenty-two females, none of whom received orthodontic treatment. The sample was evaluated initially at a mean age of 8½ years and re-evaluated an average of seven and one-half years later.

A coordinate method of analysis was employed to quantitate craniofacial proportions, growth increments, and changes of proportions. This method further permitted the evaluation of the effect of the integration of variants in the total facial morphology.

To establish a basis for the appraisal of individual cases the combined data of the sample were grouped according to sex and subjected to statistical methods.

The analyses of the development of a number of individual cases were presented for consideration. Facial patterns exhibiting good occlusions, Class II, Division 1, Class II, Division 2, and Class III malocclusions were analyzed.

It was found that the majority of faces exhibited similar modification of the profile with age. However, the growth adjustments resulting in these modifications differed in all faces.

Average tendencies were determined and offer valuable guides to prognosis. However, it must be emphasized that there are numbers of individuals who will not conform to the generalizations applicable to the majority.

News and Notes

American Association of Orthodontists

The fiftieth annual session of the American Association of Orthodontists will be held at the Palmer House in Chicago Sunday, May, 16, 1954 through Thursday, May 20, 1954.

Preliminary plans for an excellent meeting already are well advanced. A group of carefully selected essayists have received invitations to present a well-balanced program on current orthodontic problems. There will be, in addition, sessions devoted to table clinics, scientific exhibits, university research, and commercial exhibitors.

Plans are nearly complete for the customary social features of the buffet supper, stag banquet, International Luncheon, Golden Anniversary Luncheon, and the reception and dinner dance in honor of President and Mrs. James W. Ford. There also will be several exclusive parties for the ladies.

Reservations should be made directly with the Palmer House.

American Board of Orthodontics

The next meeting of the American Board of Orthodontics will be held at the Palmer House in Chicago, Ill., May 11 through May 15, 1954. Orthodontists who desire to be certified by the Board may obtain application blanks from the secretary, Dr. C. Edward Martinek, 661 Fisher Bldg., Detroit 2, Mich.

Applications for acceptance at the Chicago meeting, leading to stipulation of examination requirement for the following year, must be filed before March 1, 1954. To be eligible an applicant must have been an active member of the American Association of Orthodontists for at least three years.

The following is a list of the names of those who have been certified by the American Board of Orthodontics. It is published by permission of the Board.

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Speers, William J., 60 Charlesgate, West, Boston
Tisdale, Everett A., 230 Beacon St., Boston

MICHIGAN

Braun, Louis, 765 David Whitney Bldg., Detroit
Cheney, Edward A., 320 W. Ottawa St., Lansing
Coleman, Robert E., 1145 David Whitney Bldg., Detroit
Flett, Fred A., David Whitney Bldg., Detroit
Harris, George S., 7-266 General Motors Bldg., Detroit
Hicks, James Hilliard, 213 David Whitney Bldg., Detroit
Holmes, Scott Travis, 1205 Peck St., Muskegon
Hosmer, Harry L., Stroh Bldg., Detroit
Lappin, Milton Melvin, 17170 Livernois, Detroit
Lewis, Samuel J., American National Bank Bldg., Kalamazoo
Martinek, C. Edward, 661 Fisher Bldg., Detroit
Miller, Hunter Irving, 615 Mott Foundation Bldg., Flint
†Moore, George R.
Ponitz, Paul Vernon, 712-14 Security Bank Bldg., Battle Creek
Sheham, Harlow L., 601 Jackson City Bank, Jackson
Teetzel, Earl H., David Whitney Bldg., Detroit
VerMeulen, Victor R., Kendall Prof. Bldg., Grand Rapids
White, Oliver Wilson, David Whitney Bldg., Detroit

MINNESOTA

Baker, Joseph O., Medical Arts Bldg., St. Paul

Baker, Robert E., Medical Arts Bldg., St. Paul
deVries, Bernard G., 705 Medical Arts Bldg., Minneapolis
Dinham, George A., 1100 Medical Arts Bldg., Duluth
Dunn, Patrick M., 1246 Medical Arts Bldg., Minneapolis
Ernst, Max E., Lowry Medical Arts Bldg., St. Paul
Hyde, Walter L., 434 LaSalle Bldg., Minneapolis
Gange, Lawrence W., 506 Lowry Medical Arts Bldg., St. Paul
Pike, Joe M., 811 Medical Arts Bldg., Minneapolis
Steadman, Sherwood R., 1201 Lowry Medical Arts Bldg., St. Paul
Thomas, LeRoy A., Medical Arts Bldg., Minneapolis

MISSOURI

†Allshouse, Harry A., Jr.
Bean, Earl Calvin, 120 N. Forsyth St., St. Louis
Bedell, Everett Willis, 1504 S. Grand Blvd., St. Louis
Brandhorst, Otto W., 4952 Maryland Ave., St. Louis
Closson, Donald A., 205 Brookside Theatre Bldg., Kansas City
Hatfield, Grant B., Jr., 315 Nichols Rd., Kansas City
James, Louis M., Jr., 6247 Brookside Blvd., Kansas City
Lischer, B. E., 4559 Scott Ave., St. Louis
Pollock, H. C., 8015 Maryland Ave., St. Louis
Rodgers, Frank C., Missouri Theater Bldg., St. Louis
Shanley, Leo Michael, 7800 Maryland Ave., St. Louis
Sheldon, F. Copeland, Plaza Medical Bldg., Kansas City
Sheldon, Homer M., 6243 Brookside Rd., Kansas City
Williams, Joseph H., Beaumont Medical Bldg., St. Louis

MONTANA

Dohrman, Stanley T., Ford Bldg., Great Falls

NEBRASKA

Dunn, Arlo M., Medical Arts Bldg., Omaha
†Ludwick, Paul G., 1019 Sharp Bldg., Lincoln
Muller, Cecil G., 740 Medical Arts Bldg., Omaha
Yost, Howard, 404 First National Bank Bldg., Grand Island

NEW JERSEY

Ackerman, Aaron L., 125 Broad St., Elizabeth
Clark, Horace P., 455 W. State St., Trenton
Dimond, Howard D., 27 Liberty St., New Brunswick
Giblin, William A., 85 Park St., Montclair
Gosman, S. D., 601 Landis Ave., Vineland
Hecht, Sylvester J., 16 Broad St., Red Bank
Jonas, Charles S., 101 S. Indiana Ave., Atlantic City
Kelly, Eugene J., 455 W. State St., Trenton
Kraut, Irving, 375 West State St., Trenton
Lowry, Richard A., 302 Main St., Chatham
Mosmann, Walter A. H., 70 Anderson St., Hackensack
Rosenast, Emil O., Wilson Bldg., Camden
Waldron, Ralph, 549 High St., Newark
Whitman, Clifford LeRoys, 210 Main St., Hackensack
Wolfson, Abraham, 31 Lincoln Park, Newark

NEW YORK

Abelson, Josephine M., 136 East 36th St., New York
†Barber, Henry U., Jr.
Bedell, Walter R., 49 Market St., Poughkeepsie
Bien, Saul M., 654 Madison Ave., New York
Brody, Eli S., 57 W. 57th St., New York
Buchin, Irving, 108-50 71st Ave., Forest Hills
Butler, E. Stanley, 524 N. Ave., Medical Bldg., New Rochelle
†Caddick, George H., 53 Dove St., Albany
Callaway, George Samuel, 654 Madison Ave., New York
†Carrabine, Oscar
Chapin, Walter Coolidge, 2 East 54th St., New York
Corn, Arthur M., 88-56 163rd St., Jamaica
*Dewey, Martin, New York
Dolce, John J., 2922 Grand Concourse, New York
Dow, Stanley Milton, 630 Fifth Ave., New York
Eaton, Ralph W., 16 North Goodman, Rochester
Eby, Joseph D., 121 East 60th St., New York

Ellis, Walter H., 333 Linwood Ave., Buffalo
†Ferris, Henry C., New York
Fischer, Bercu, Two East 54th St., New York
Frank, Barnett, 14 Franklin St., Rochester
*Futterman, Max J., 2021 Grand Concourse, New York
†Gibbin, Floyd E., Buffalo
Glaser, Clifford G., 675 Delaware Ave., Buffalo
Gray, Willard A., Medical Arts Bldg., Rochester
Greenstein, Arthur V., One West 81st St., New York
Grenadier, Irving, 888 Grand Concourse, New York
Hemley, Samuel, 745 Fifth Ave., New York
Hillyer, Norman L., 1 East 57th St., New York
Houghton, William G., 644 Woolworth Bldg., Watertown
Howes, Ashley E., 650 Main St., New Rochelle
Jacobson, Oscar, 35 West 81st St., New York
Jerrold, Harry E., 359 New York Ave., Brooklyn
Jerrold, Theo L., 131 Fulton Ave., Hempstead
Keller, William C., 40 East 49th St., New York
King, Edward C., Seneca Bldg., Ithaca
†Kregarman, Samuel L., 745 Fifth Ave., New York
†Lay, Victor Weller, Buffalo
Lees, Abraham, 745 Fifth Ave., New York
Lifton, Jacob C., 57 West 57th St., New York
Lusterman, Edward A., 253 Sunrise Highway, Rockville Centre
Madden, John H., 18 East 48th St., New York
Marshall, David, 713 E. Genesee St., Syracuse
Maxien, Michael J., 211 Park Ave., Long Island, New York
Mayers, John J., 64 Metropolitan Oval, New York
Mossberg, David, 36 West 59th St., New York
Munblatt, Max Albert, 57 West 57th St., New York
Murphy, Edward G., 9 Rockefeller Plaza, New York
Nicolai, Frank, 142 Joralemon St., Brooklyn
Pasternak, Richard, 169 Fulton Ave., Hempstead
Porter, Lowrie J., 41 East 57th St., New York
Prezzano, Wilbur J., Medical Centre, White Plains
†Pullen, Herbert A., Buffalo
Riesner, Sidney E., 136 East 36th St., New York
Roberts, Myron A., 471 Linwood Ave., Buffalo
Root, William Robert, 333 Linwood Ave., Buffalo
Sage, John, 133 Sanford Ave., Flushing
Salzmann, Jacob A., 654 Madison Ave., New York
†Schlencker, Eda B.
Schure, Joseph, 1 Hanson Pl., Brooklyn
Siegal, Milton, 495 State St., Albany
Sillman, John H., 667 Madison Ave., New York
Singer, S. William, 4 West 72nd St., New York
Sippel, Harold Edward, 32 Linwood Ave., Buffalo
Smith, Eldridge P., 146 Hempstead Ave., Rockville Centre
Sorenson, Otto J., 18 East 48th St., New York
†Spahn, Charles A., 745 Fifth Ave., New York
Spiller, Henry, 333 Linwood Ave., Buffalo
Squires, Franklin A., Medical Centre, White Plains
Stolzenberg, Jacob, 1 Nevins St., Brooklyn
Sturtevant, Robert C., 88-23 184th St., Jamaica
Sved, Alexander, 654 Madison Ave., New York
Totten, Arthur Cranston, 121 East 60th St., New York
Trier, Jerome H., 105 East 85th St., New York
Ward, Chester D., 269 Genesee St., Utica
Waugh, Leuman M., 931 Fifth Ave., New York
Weinberger, Bernard W., 119 West 57th St., New York
Weingart, M. Alden, 119 West 57th St., New York
Whitmarsh, H. DeForest, 49 Front St., Binghamton
Whitson, Glenn Haverly, 80 Hanson Pl., Brooklyn
†Young, J. Lowe, New York
Zeitz, Sidney J., 1 Nevins St., Brooklyn

NORTH CAROLINA

Bumgardner, A. S., 818 Professional Bldg., Charlotte

Carr, Daniel Thomas, One Eleven Corcoran St., Durham
Hale, G. Fred, Professional Bldg., Raleigh
Owen, Olin Watson, 1003 Liberty Life Bldg., Charlotte

NORTH DAKOTA

Hoghaug, Maurice A., 506 Security Bldg., Grand Forks

OHIO

Ackerman, Samuel, 332 Doctors Bldg., Cincinnati
Adelstein, Charles S., 929 Rose Bldg., Cleveland
Aldrich, Frederick Raymond, 327 East State St., Columbus
Bach, Ernest N., Professional Bldg., Toledo
Barnes, Richard E., 638 Keith Bldg., Cleveland
Beatty, Richard C., 1140 Hanna Bldg., Cleveland
Frankel, Herbert G., 353 Doctors Bldg., Cincinnati
Gould, Joseph R., 620 Rose Bldg., Cleveland
Grimmett, Frank Ashley, 401 Keith Albee Bldg., Youngstown
Huber, Russell E., 660 Fidelity Medical Bldg., Dayton
Jones, Earl G., 185 East State St., Columbus
Kirsten, Maurice P., 921 W. Main Cross St., Findlay
Lewis, Arthur B., 804 Hulman Bldg., Dayton
†McPhail, John A., Cincinnati
Neuger, Eugene L., 13910 Cedar Rd., Cleveland
Newcomb, Morse R., 13110 Shaker Square, Cleveland
Peterson, Howard W., 510 Sinclair Bldg., Steubenville
Rogers, Earl H., 816 Market Ave. North, Canton
Sargeant, Walter S., Nicholas Bldg., Toledo
Vosmik, Charles J., Keith Bldg., Cleveland
Wade, Robert E., 327 E. State St., Columbus
Wilson, W. Frank, Richland Trust Bldg., Mansfield

OKLAHOMA

Flesher, William E., Medical Arts Bldg., Oklahoma City
†McCarty, Oren H., Tulsa
Sorrels, Harry H., 1003 Medical Arts Bldg., Oklahoma City
Sorrels, T. Wallace, 1003 Medical Arts Bldg., Oklahoma City
Woodring, E. Forris, 816 Medical Arts Bldg., Tulsa

OREGON

Dinham, William R., Selling Bldg., Portland
Hoskin, Sidney Blaine, 627 Medical-Dental Bldg., Portland
†Meaney, Phillip T.
Rees, Denton J., 901 Selling Bldg., Portland
†Walls, James Thompson

PENNSYLVANIA

Brader, Allen C., 1350 Hamilton St., Allentown
Cooper, Herbert K., 26 North Lime St., Lancaster
Flint, D. Willard, Jenkins Arcade, Pittsburgh
Flint, Edwin Grant, Jenkins Arcade, Pittsburgh
Flint, Wilson Revis, Jenkins Arcade, Pittsburgh
Gilbert, Samuel G., 1930 Chestnut St., Philadelphia
Groth, Geneva E., 1301 Medical Arts Bldg., Philadelphia
Hedges, Robert B., 703 West Ave., Jenkintown
Irish, Russel E., Jenkins Arcade, Pittsburgh
Jackson, Andrew F., Medical Arts Bldg., Philadelphia
Jackson, John M., Medical Arts Bldg., Philadelphia
†Markus, Moe Bernard
Mershon, John V., 1520 Spruce St., Philadelphia
Metz, Harry C., Highland Bldg., Pittsburgh
Nash, Francis William, 801 Medical Arts Bldg., Scranton
Patton, Charles Heston, 235 South 15th St., Philadelphia
Reid, Paul Victor, Medical Arts Bldg., Philadelphia
Ross, John, 1520 Spruce St., Philadelphia
Sager, Aubrey P., 1218 Medical Arts Bldg., Philadelphia
Scull, Raymond T., 134 North Eighth St., Reading
Sterrett, Donald Spencer, 549 West Eighth St., Erie
†Strayer, Edward Ray
Thompson, Will McLain, Jr., 643 Oliver Bldg., Pittsburgh
Volckmer, Charles W., 21 West Third St., Williamsport

Wright, Augustus L., 255 So. 17th St., Philadelphia
Zeisse, Carl, Medical Tower, 255 S. 17th St., Philadelphia

RHODE ISLAND

Osborn, Donald Daggett, 133 Waterman St., Providence
Webster, Raymond L., 133 Waterman St., Providence

SOUTH CAROLINA

Wells, Clyde O., Montgomery Bldg., Spartanburg

TENNESSEE

Bowyer, Frank P., 608 Medical Arts Bldg., Knoxville
Caine, Winston P., Medical Arts Bldg., Chattanooga
Leonard, Neil Jones, 1108 Exchange Bldg., Memphis
Oliver, Oren A., 1915 Broadway, Nashville
Oliver, William H., 1915 Broadway, Nashville
Weber, Faustin Neff, 811 Medical Arts Bldg., Memphis
Wood, Claude R., 1640 W. Cumberland, Knoxville

TEXAS

Arnold, Edmond B., 3306 Fannin St., Houston
Ballard, Bibb Hunter, 1316 Medical Arts Bldg., Dallas
Bell, Brooks, Medical Arts Bldg., Dallas
†Busby, Oscar E., Dallas
Chapman, William T., 805 First National Bank Bldg., El Paso
Cunningham, Jesse Stier, 2418 Jarvis St., Houston
Gaylord, Robert Edmund, 25 Highland Park Village, Dallas
Gillespie, Guy Melton, 404 Alexander Bldg., Abilene
†Harrison, Frank H., Wichita Falls
Murphy, Willis Hull, 516 Medical Arts Bldg., Fort Worth
Peavy, Daniel Cornelius, 746 Milam Bldg., San Antonio
†Rowland, C. T., 1134 Nix Bldg., San Antonio
Schudy, Fred F., 2626 Westheimer, Houston
Serafino, Joseph P., 1195 McFaddin St., Beaumont
Spencer, Paul G., 1817 Austin Ave., Waco
Tomlin, Noel J., Jr., 8229 Preston Rd., Dallas
Westfall, Albert P., 310 Second National Bank, Houston
Williams, Tom M., 612 Medical Arts Bldg., Dallas
Winston, Louis Simpson, 4115 Fannin St., Houston

VIRGINIA

Bowles, Charles F., Professional Bldg., Richmond
Haynes, W. Tyler, Medical Arts Bldg., Richmond
Jones, Claude S., 325 Dominion Bank Bldg., Bristol
Muir, Norborne F., 713 Shenandoah Life Bldg., Roanoke
†Pearson, William Herndon
Walker, Marion Bagley, Medical Arts Bldg., Norfolk

WASHINGTON

Bishop, Everard Allen, 703 Cobb Bldg., Seattle
Fraser, Emery James, 1107 Medical-Dental Bldg., Seattle
Gothenquist, Rudolph O., 707 Seaboard Bldg., Seattle
Lewis, Paul Donovan, 643 Stimson Bldg., Seattle
Moore, Harry N., 503 Cobb Bldg., Seattle
†Morehouse, Harry L., Spokane
McCulloch, George R., 307-319 So. 12th Ave., Yakima
Philbrick, Richard C., Fourth and Pike Bldg., Seattle
Stoller, Arnold E., 913 Fourth and Pike Bldg., Seattle

WEST VIRGINIA

Jarrett, William M., 901 Kanawha Bank & Trust Bldg., Charleston

WISCONSIN

Delbridge, Howard N., 407 Goodwin Block, Beloit
Franklin, Jacob Baer, 208 East Wisconsin Ave., Milwaukee
Gilling, Lawrence B., 410 Bellin Bldg., Green Bay
Hering, Russell A., 324 E. Wisconsin Ave., Milwaukee
Kloehn, S. J., 512 Zuelke Bldg., Appleton
Milliette, Gerald T., 735 North Water St., Milwaukee
Mueller, Herbert H., 312 Exchange Bldg., LaCrosse
Rhode, Arthur C., 324 East Wisconsin Ave., Milwaukee

Schoenwetter, Robert F., E.R.A. Bldg., Oshkosh

CANAL ZONE

†Lt. Col. Richard F. Thompson, Dental Corps, U. S. Army, France Field

CANADA

Bean, Harvey G., 170 St. George St., Toronto 5, Ontario

Bradley, Sidney W., 142 Laurier Ave., West, Ottawa, Ontario

Chapman, Lloyd, 925 W. Georgia, Vancouver

Crouch, Stanley S., 86 West Bloor St., Toronto, Ontario

Fisk, G. Vernon, Medical Arts Bldg., Toronto 5, Ontario

Franklin, Gerald, 1414 Drummond St., Montreal, Quebec

Geoffrion, Paul, Medical Arts Bldg., Montreal

†Grieve, George W.

Hyams, Bernad L., Drummond Medical Bldg., Montreal, Quebec

†Kennedy, C. Angus, Toronto, Ontario

Lea, William J., Medical-Dental Bldg., Vancouver, Brit. Columbia

Lepine, Louis, Medical Arts Bldg., Montreal

Moore, Stephen A., 260 Queen Ave., London, Ontario

Walley, Kenneth M., 718 Granville St., Vancouver

For application blanks or additional information address the secretary.

Middle Atlantic Society of Orthodontists

The next meeting of the Middle Atlantic Society of Orthodontists will be held at the Claridge Hotel in Atlantic City, N. J., Sunday, Monday, and Tuesday, Oct. 18, 19, and 20, 1953. The following program has been arranged.

Sunday, October 18

7:00 P.M. President's reception (informal)

Monday, October 19

9:00 A.M. Registration

10:00 A.M. Differential Diagnosis of Temporomandibular Problems. Robert E. Moyers, Ann Arbor, Mich.

11:15 A.M. Discussion

12:00 NOON Luncheon

1:30 P.M. Business Meeting

2:00 P.M. Treatment of Class II Malocclusion. Will M. Thompson, Jr., Pittsburgh, Pa.

3:30 P.M. Discussion

4:00 P.M. Table Clinics

These clinics are in the form of round table discussions.

The Orthodontic Consultation. Stephen C. Hopkins, Washington, D. C.

Practice Management in Relation to Recalls and Retention. Paul Hoffman, Washington, D. C.

Practice Management in Mixed Dentition Cases. Robert Swinehart, Baltimore, Md.

Practice Management in Preventive Orthodontics. Aubrey P. Sager, Philadelphia, Pa.

The American Board. Raymond L. Webster, Providence, R. I.

Tuesday, October 20

9:00 A.M. Registration

9:30 A.M. A Rational Viewpoint in Orthodontics. Joseph D. Eby, New York, N. Y.

10:45 A.M. Discussion

11:30 A.M. Business Meeting

1:30 P.M. Panel Discussion of Class II Malocclusion. Moderator, George M. Anderson, Baltimore, Md.

ROBERT E. MOYERS
WILL M. THOMPSON, JR.
JOSEPH D. EBY

Pacific Coast Society of Orthodontists

The Northern Component meets the second Tuesday of March, June, September, and December.

The Central Component meets the second Tuesday of March, June, September, and December.

The Southern Component meets the second Friday of March, June, September, and December.

OFFICERS

President, Arnold E. Stoller, Seattle, Wash.
President-Elect, A. Frank Heimlich, Santa Barbara, Calif.
Vice-President, Vernon L. Hunt, Eureka, Calif.
Secretary-Treasurer, Raymond M. Curtner, San Francisco, Calif.

NORTHERN COMPONENT

Says Secretary Jim Keenan: "We haven't had any meeting this year in deference to the San Francisco meeting. Our next will be some time in mid-September or first part of October. We tried to get Bercu Fisher out for that, without luck, and are now trying to get George Crozat."

CENTRAL COMPONENT

Our society met on June 9, 1953, at the Alexander Hamilton Hotel and Chairman Ray Brownell called the meeting to order at 8:40 P.M. Six senior orthodontic students from the University of California were introduced. Chairman Brownell entertained a motion that the minutes of the last meeting be approved as published in the Bulletin. This was regularly passed. Secretary-Treasurer Raymond Curtner reported that the balance in the commercial account was $1,393.83, also that $730.00 had been deposited in a savings account, which was the amount collected in the Special Fund for the A.A.O. meeting in San Francisco in 1955.

Reporting for the membership committee, George Hahn advised the members and guests that changes in the P.C.S.O. By-Laws now permitted the establishing of associate memberships in the component societies. In effect, it would mean that anyone completing a recognized orthodontic course or a year of preceptorship with an active member (augmented by short courses) would be eligible to apply for associate membership. An associate member would have full rights of membership except for voting and holding office. George Hahn advised that the way an associate member becomes an active member of the P.C.S.O. and A.A.O. would be as follows:

1. He must have three years of exclusive practice of orthodontics.
2. He must have been an *associate* member of a component society—except in cases of transfer from outside the area of P.C.S.O.
3. He must submit ten case reports complete with models and x-rays to membership committee of P.C.S.O., five of these cases must be retained, the other five may be progress reports. This is minimum requirement and may be augmented or supplemented as the committee desires.

P.C.S.O. Past President Blake congratulated George and other members of the committee for the very splendid work which they had accomplished, spoke of the urgent need for this kind of work, and there was no further discussion from the floor.

Ray Curtner then presented a token of the Dallas meeting to Chairman Brownell, which he accepted with an appropriate expression of gratitude and following this, Fred West reported on the national meeting of the A.A.O. held in April in Dallas.

Secretary-Treasurer Curtner announced that new application forms for membership would soon be available and would be sent out by the society to appropriate individuals. He stressed that these should be returned immediately upon their receipt. In the near future,

regulations are to be developed concerning guest privileges for members and associate members of the section.

Your secretary received a request from the telephone company as to our desire regarding a change in the presently existing policy in the classified section of the phone book of listing orthodontists' names under the general heading of "Dentists." At the present time the word "Orthodontist" appears as a heading in the yellow pages of the directory, but instead of listing names thereunder, there is the notation "See Dentists." There was a sufficient amount of discussion from the floor representing different points of view that George Hahn moved and Art Skaife seconded, a motion that a committee be appointed for study of the matter, with the committee instructed to determine what the practice is in other parts of the state. Chairman Brownell appointed Drs. Skaife (chairman), Lindsay, and Blake. This committee later rendered its report that the present policy be maintained as is.

Ray Curtner commented on the desirability of revising our Component Society By-Laws, and Murray Ballard moved and George Hahn seconded that a committee be appointed to study the By-Laws for possible revision. Chairman Brownell named for this committee Drs. Eugene West (chairman), Elsasser, and Snyder.

Secretary-Treasurer Curtner then explained that it was necessary for him to resign from his office because of the obligations imposed upon him in his new office as Secretary-Treasurer of the Pacific Coast Society of Orthodontists. He recommended that it would be good policy to keep a Secretary-Treasurer for three years, as the work requires time in becoming familiar with procedures of the component and the Pacific Coast Society of Orthodontists. At this point the business meeting was adjourned for a brief period.

After an intermission, Bill Smith moved and Fred West seconded the proposal that Ray Curtner's resignation be accepted with thanks and this was passed with no objections.

Pat Huberty nominated Arnold Wieser for the office of Secretary-Treasurer of the Central Section, and Walter Straub seconded the nomination. Bill Smith moved that the nominations be closed and Bill Elsasser seconded the motion. The motion passed unanimously and Arnold was declared the new Secretary-Treasurer of the Central Component.

Chairman Brownell then turned the meeting over to the Program Chairman, Wendell Wylie, who introduced William Elsasser so that he might present a very interesting account of his research conducted under the auspices of the United States Public Health Service, in which he conducted an epidemiological study of malocclusion, after having devised a special instrument known as an orthometer for the purpose. There were several questions from the floor and an interesting discussion after Bill concluded the formal portion of his paper. Chairman Brownell then complimented him on his presentation and, after a final inquiry as to whether there might be further business to be brought before the group, the meeting was adjourned.

SOUTHERN COMPONENT

The regular quarterly meeting was held at the Chapman Park Hotel, 215 S. Alexandria Ave., Los Angeles, Calif., on Friday, June 12, 1953.

The meeting was called to order by Chairman Robert Whitney at 2:30 P.M.

Program Chairman, Earl Crane introduced Joseph C. Risser, M.D., who spoke on "Bone Health in Orthodontics and Orthopedics." His subject was well presented and very well received. He particularly stressed good nutrition for development of healthy bones. There was considerable discussion, following Doctor Risser's presentation, concerning our mutual problems.

Dr. Loryea of Cuba and Dr. Olaviaga of Argentina were introduced.

The application of Gene Springer for membership in the Southern Component was unanimously approved.

Chairman Whitney complimented Arthur L. Everett for the fine organization and presentaiton of a group clinic entitled "What Is Happening in Orthodontics," which was presented before the Southern California State Dental Association Meeting in April.

Fred McIntosh reported on the Crippled Children's Act and recommended that a committee be appointed to investigate the advisability of setting up an orthodontic staff at the General Hospital to work in close harmony with Dr. Paul Hamilton, the Chief Dentist at the Los Angeles General Hospital. Chairman Whitney appointed this new committee consisting of Roscoe Keedy (chairman), Fred McIntosh, Townsend Paul, and Ben Reese.

Fred McIntosh made a motion, seconded by Walter Furie, that the membership of the Southern Component wishes to go on record that it is the policy of this group that the cases to be certified for treatment by the committee of the California State Crippled Children's Act be selected on the basis of restoration of function and occlusion. Motion passed.

It was moved by Walter Furie, and seconded by L. R. Sattler, that Hays N. Nance, for his outstanding contributions to orthodontics, be made an honorary member of the Southern Component, retroactive as of Dec. 31, 1952, and recommendations be made to the Pacific Coast Society of Orthodontics that his name be so placed on their records. Motion passed. Hays has not been in the active practice of orthodontics for the past five years.

A report from Sydney Cross was made on the presentation of a parchment or scroll to past chairmen, as a suitable recognition of their services and recommended that the executive committee proceed with plans to obtain these plaques.

It was announced that the American Society of Dentistry for Children would like to have as many orthodontists belong to this organization as possible in order to further the understanding of the dental problems of the child.

The meeting was adjourned for social hour and dinner.

Great interest in the Twin Wire Mechanism technique of our February Meeting's guest clinician, Jos. E. Johnson, has been evidenced throughout the country for many years.

As a consequence, Joe was prevailed upon to present his course to a group prior to our meeting, which was received with much enthusiasm and satisfaction.

NOTICE

Reading of A.B.O. theses by diplomates before constituent societies has been disallowed for the past several years. This stand was taken because of serious abuses encountered before the policy was adopted.

The Board has created a Pool of Theses available for reading before constituent societies should they be desired. Permission for inclusions on programs must be requested in writing by the secretary of the constituent society and filed with the secretary of the American Board of Orthodontists.

CENTRAL COMPONENT

Dean Harold J. Noyes was elected Vice-President of the American Association of Dental Schools for 1953 at its 30th Annual Meeting in March in Philadelphia. . . . In case you hadn't heard it, pioneerer and one of the nation's leading orthodontists, John V. Mershon passed away in February, age 87. . . . Earl Lussier, Allen Scott and Lyle Russell took it on the chin with various illnesses but all have snapped back nicely. . . . We are all very proud that Spencer Atkinson had bestowed upon him the Albert H. Ketchum Memorial Award at the Dallas Meeting. . . . Irwin Marcus and Oliver Hartman presented a clinic at the Annual Meeting of the California State Dental Association in April. The title was "Factors in Malocclusion Which Indicate Early Treatment."

University of Tennessee

The University of Tennessee College of Dentistry will offer its first graduate course beginning Jan. 1, 1954.

The course will be in orthodontics (straightening of the teeth) in which a Master of Science degree may be earned.

Announcement of the course was made by the University of Tennessee Executive Committee at a meeting at Knoxville.

Director of the program will be Dr. Faustin N. Weber, professor of orthodontics at the dental college and well-known Memphis orthodontist.

The applicants will be accepted for the course every eighteen months. The orthodontic clinic will be located on the fifth floor of the dental college at Monroe and Dunlap, Dr. Weber said.

Requirements for taking the course include a Doctor of Dental Surgery degree. The course will take six quarters (eighteen months) to complete. It will be composed of 77 hours of credit.

Dr. Weber said students at the college previously were awarded certificates of competency in orthodontics.

A portion of the fifth floor of the dental college, composed of 3,500 square feet, is currently used for storage purposes. It will be finished and made into an orthodontic clinic, seminar room, staff offices, and laboratories.

The dental college, second largest in North America, will be one of sixteen offering Master's Degrees in orthodontics in the United States. It will be the second in the South. A similar graduate course in dental orthopedics will be offered at the University of North Carolina at Chapel Hill beginning in September.

American Dental Association

The *Journal of the American Dental Association* declared editorially today that the "increasingly exaggerated" claims made for tooth pastes and powders have produced growing concern among members of the dental profession.

The Journal said advertisers were riding "roughshod over the public" in the face of all scientific evidence to the contrary.

"Many of these superclaims are on the same low level as those made for discredited cancer cures and arthritis remedies," the editorial said.

The American Dental Association's Council on Dental Therapeutics, which evaluates dental products, has not recognized the claims of special curative qualities for any dentifrice now on the market on the grounds that inadequate evidence exists to substantiate such claims.

The council has reported that no dentifrice offered to the public has been shown to have a usefulness beyond assisting the toothbrush in cleaning the accessible surfaces of the teeth.

The child with cleft lip and cleft palate is as urgent a public health problem as the youngster with cerebral palsy or infantile paralysis, a dental scientist declared today in the *Journal of the American Dental Association.*

Dr. Herbert K. Cooper, of Lancaster, Pa., who has been widely honored for his activities as director of the Lancaster Cleft Palate Clinic, reported that one in every 700 infants is born with cleft lip or cleft palate or both defects.

He said the most effective treatment for the condition calls for specialists in various fields, working together.

Dr. Cooper said that, while many states have recognized the problem of the cleft lip-cleft palate child by providing surgical care and hospitalization, it is now recognized that surgery alone is not adequate and, in some cases, is actually detrimental.

He described the long-time treatment of each case at the Lancaster Clinic and emphasized that decisions concerning treatment are made only at group consultations of all specialists concerned in the case.

Included are a child specialist or pediatrician, a surgeon, an orthodontist or dentist specializing in mouth irregularities, a psychologist, and a speech specialist.

Dr. Cooper said that parents of a child born with cleft lip or cleft palate often need treatment more than the child.

"The over-protection which the average mother gives the patient is as great a hazard for the individual's future life as the deformity itself," he said.

Dr. Cooper said the psychologist visits the child's parents from time to time to emphasize the importance of adopting a proper attitude toward the child.

"Though these periodic visits may seem to some to be unnecessary, they are important in their psychological effect," he said. "At this stage, it is the parents who are suffering from trauma (injury), not the child."

Dr. Cooper deplored the tendency toward specialization in the health field without a close integration or coordination of specialties.

"The only way to achieve clear thinking is to learn to treat the individual as a whole rather than to concentrate on a part of him," he said.

Notes of Interest

C. Roy Brooks, D.D.S., announces the removal of his offices to 18400 Mack Ave., Grosse Pointe Farms 36, Mich.

Edward L. Corlett, D.M.D., M.S., announces the opening of his new office at 277 North Glassell St., Orange, Calif., practice limited to orthodontics.

E. J. Joseph, D.D.S., announces the opening of offices at Room 406 Professional Bldg., 1300 Market St., Wheeling, W. Va., practice limited to orthodontics.

Thomas C. Stults, D.D.S., announces the opening of his office for the practice of orthodontics at 614 Abercorn St., Savannah, Ga.

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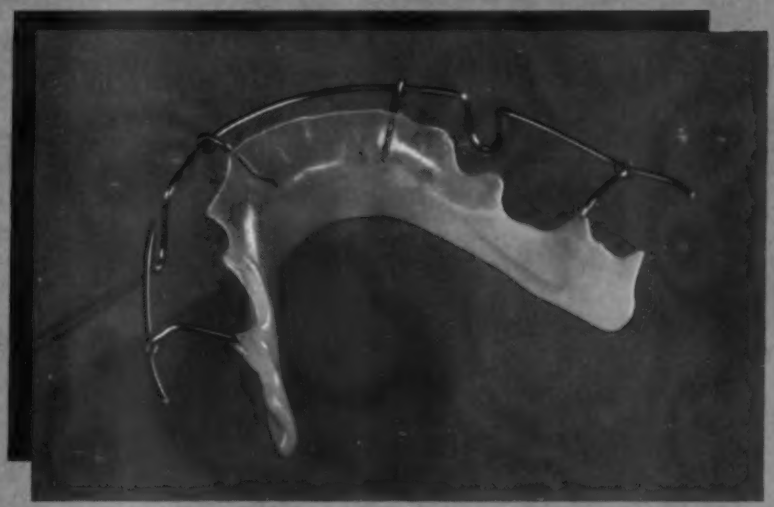

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